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ACCEPTABLE BRIDGE PLANS

THE PURPOSE OF THIS BOOK OF ACCEPTABLE BRIDGE PLANS IS TO MAKE AVAILABLE FOR THE FOREST SERVICE THE BEST BRIDGE PLANS DEVELOPED IN EACH REGION.

THIS DOES NOT MEAN THAT ALL FUTURE BRIDGE PLANS MUST CONFORM TO ONE OF THOSE SHOWN HEREIN. THE REGIONS ARE STILL FREE TO DESIGN NEW BRIDGES WHENEVER NECESSARY. HOWEVER, BY REFERENCE TO THIS BOOK, A PLAN MAY BE FOUND THAT WILL SUIT THE PURPOSE AND THUS OBVIATE THE NECESSITY OF MAKING A NEW DESIGN. THE INDEX WHICH FOLLOWS WILL SHOW WHERE COPIES OF THE VARIOUS PLANS MAY BE SECURED.

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INDEX

SECTION 1 — TIMBER BRIDGES

Type	Region	Drawing Number	Name	Span	Height	Width Roadway	Loading	Remarks	Page
King Post Truss	8	B-4701		25,30,35		12	H-10,H-15		1
Howe Truss	8	B-5304		60		14	H-15		2
	6	5-M-44		50,60,70		6		Horse Trail	3
	6	5-M-45		80,90,100		6		Horse Trail	4
	6	1-P-7		80,90		14	H-15		5
	6	1-P-7		80,90		14	H-15		6
	6	1-P-8		80,90		14	H-15		7
	6	1-P-8		80,90		14	H-15		8
	6	1-P-2		60		14	H-15		9
	6	1-P-3	South Nehalem River	163		18	H-15		10
	6	1-P-3	South Nehalem River	163		18	H-15		11
	6	1-P-3	South Nehalem River	163		18	H-15		12
	6	1-P-3	South Nehalem River	163		18	H-15		13
Treated Deck Truss	6	5-M-15	Twin Buttes	101		14	H-15		14
	6	5-M-20		100		14	H-15		15
	6	5-M-20		100		14	H-15		16
Arch Type	6	1-P-14	North Umpqua	135		14			17
	6	1-P-14	North Umpqua	135		14			18
	6	1-P-14	North Umpqua	135		14			19
	6	1-P-14	North Umpqua	135		14			20
	6	1-P-14	North Umpqua	135		14			21
	6	1-P-14	North Umpqua	135		14			22
	6	1-P-14	North Umpqua	135		14			23
	6	1-P-14	North Umpqua	135		14			24
	6	1-P-14	North Umpqua	135		14			25
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	6	5-M-26		10-60		3		Foot Trail	27
	6	5-M-28		50-90		3		Foot Trail	28
	6	5-M-27		10-50		6		Horse Trail	29
	6	5-M-29		50-90		6		Horse Trail	30
	6	9-F-10		50-80		14	H-15		31
	8	B-1501		9-29		11	H-10,H-15		32
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	1	77-B	Sullivan Lake	190		12			35
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Type	Region	Drawing Number	Name	Span	Height	Width Roadway	Loading	Remarks	Page
Concrete Slab	3	ER 10		10		16			39
	7	B-901		10-25		19	H-15		40
	7	B-2301		10-25		11	H-15		41
	7	B-15101		10-25		11	H-15	30° skew	42
	7	B-15201		10-25		19	H-15	30° skew	43
	1	154		35		18	H-15		44
	5		Big Creek	110		20	H-15		45
	5		Big Creek	110		20	H-15		46
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	5		Big Creek	110		20	H-15		48

SECTION 3 — STEEL BEAM BRIDGES

Girder	1	110		30		12	15-T		49
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	1	112		40		12	15-T		52
	1	113		45		12	15-T		53
	1	156		45		18	15-T		54
	1	114		50		12	15-T		55
	1	115		60		12	15T		56
	7	B-7601		17-65		11	H-10		57
	7	B-8901		17-65		11	H-10	30° skew	58
	7	B-1601		25-65		11	H-15		59
	7	B-6601		25-65		11	H-15	30° skew	60
	7	B-1701		25-65		19	H-15		61
	7	B-2201		25-65		19	H-15		62
	7	B-2202A		25-65		19	H-15		63
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	5		Little Crane Creek	30		12	H-15		65
	5		Little Crane Creek	30		12	H-15		66
	5		Kaweah River	55		12	H-15		67
Continuous Beam	5		Cottonwood Creek	70		12	H-15		68
	5		Cottonwood Creek	70		12	H-15		69
	5		Tule River	120		12	H-15		70
	5		Tule River	120		12	H-15		71
	5		Tule River	120		12	H-15		72
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SECTION 3 — STEEL BEAM BRIDGES CONT.

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SECTION 4 — STEEL TRUSS BRIDGES

Type	Region	Drawing number	Name	Span	Height	Width Roadway	Loading	Remarks	Page
Through	1	78		60		12	15-T		83
	1	80		60		12	15-T	Part skew	84
	1	76-B		70		13½	15-T		85
	1	49		80		12	15-T		86
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	1	118		100		12	15-T		88
	1	120		100		18	15-T		89
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	1	39-A		200		12	15-T		93
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	5		Elk Creek	75		11	H-15		97
	5		Elk Creek	75		11	H-15		98
	5		Elk Creek	75		11	H-15		99
	5		Lumsden	84		11½	H-15		100
	5		Lumsden	84		11½	H-15		101
	5		Lumsden	84		11½	H-15		102
	5		Italian Bar	98		12	H-15		103
	5		Italian Bar	98		12	H-15		104
	5		Italian Bar	98		12	H-15		105
	5		Italian Bar	98		12	H-15		106
	5		Italian Bar	98		12	H-15		107
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	5		Salyer	320		11	H-15		111

SECTION 4 — STEEL TRUSS BRIDGES CONT.

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	5		Salyer	320		11	H-15		113
	5		Salyer	320		11	H-15		114
	5		Salyer	320		11	H-15		115
	5		Salyer	320		11	H-15		116
	5		Salyer	320		11	H-15		117
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	5		Upper Brown's Creek	50		12	H-15		119
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	7	B-8201		70		19	H-15		121
	7	B-11301		80		11	H-15		123
	7	B-9101		93		11	H-10		124
	7	B-6901		112		19	H-10		125
	7	B-1901		120		11	H-15		126
Continuous	5		Junction City	140		12	H-15		127
	5		Junction City	140		12	H-15		128
	5		Junction City	140		12	H-15		129
	5		Junction City	140		12	H-15		130
	5		Junction City	140		12	H-15		131
	5		Junction City	140		12	H-15		132

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	5		Standard	300		11	H-15		133
	5		Standard	300		11	H-15		134
	5		Standard	300		11	H-15		135
	5		Standard	300		11	H-15		136
	5		Standard	300		11	H-15		137
	5		Standard	300		11	H-15		138
	5		Standard	300		11	H-15		139
	5		Standard	300		11	H-15		140
	5		Middle Fk. American R	200		12	H-15		141
	5		Middle Fk. American R	200		12	H-15		142
	5		Middle Fk. American R	200		12	H-15		143
	6	5-M-37		60-400		6		Horse Trail	144
	6	5-M-37		60-400		6		Horse Trail	145

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SECTION 5 SUSPENSION BRIDGES CONT.

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	6	6-M-18	Clackamas	210		14	H-15		146
	6	6-M-18	Clackamas	210		14	H-15		147
	6	6-M-18	Clackamas	210		14	H-15		148
	6	6-M-18	Clackamas	210		14	H-15		149
	6	5-M-18	Packwood	249		14	H-15		150
	6	5-M-18	Packwood	249		14	H-15		151
	6	5-M-18	Packwood	249		14	H-15		152
	6	5-M-18	Packwood	249		14	H-15		153
	6	5-M-18	Packwood	249		14	H-15		154
	6	5-M-18	Packwood	249		14	H-15		155
	6	5-M-13	Rogue River	345		14	H-15		156
	6	5-M-13	Rogue River	345		14	H-15		157
	6	5-M-13	Rogue River	345		14	H-15		158
	6	5-M-13	Rogue River	345		14	H-15		159
	6	5-M-13	Rogue River	345		14	H-15		160
	6	5-M-13	Rogue River	345		14	H-15		161
	6	5-M-13	Rogue River	345		14	H-15		162
	6	5-M-13	Rogue River	345		14	H-15		163
	6	5-M-13	Rogue River	345		14	H-15		164
	6	5-M-13	Rogue River	345		14	H-15		165
	6	5-M-13	Rogue River	345		14	H-15		166
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	7	B-12002		8		11			169
	7	B-12001		8		11			170
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	7	B-2401			Var.	Var.			175
	8	B-2601			7-14	11			176
	7	B-2701			10-20	19			177
	7	B-6201			Var.	Var.			178
	7	B-6202			Var.	Var.			179
	7	B-6301			7-22	11			180
	7	B-6302D			7-22	11			181
	7	B-6303D			7-22	11			182
	7	B-6304D			7-22	11			183
	7	B-6305D			7-22	11			184
	7	B-6501			12-18	Var.			185
	7	B-6502D			12-18	Var.			186
	7	B-6503D			12-18	Var.			187
	7	B-6504D			12-18	Var.			188
	7	B-6505D			12-18	Var.			189
	7	B-6801			4-13	Var.			190
	7	B-8506			Var.	Var.			191
	7	B-8701			12-18	Var.			192
	7	B-13707			18	19			193
	7	B-13708			18	19			194
	8	B-13601			12	11			195
	8	B-13605			12	11			196
	8	B-13602			14	11			197
	8	B-13606			14	11			198
	8	B-13603			16	11			199
	8	B-13607			16	11			200
	8	B-13604			18	11			201
	8	B-13608			18	11			202
	8	B-13701			12	19			203
	8	B-13702			12	19			204
	8	B-13703			14	19			205
	8	B-13704			14	19			206
	8	B-13705			16	19			207

SECTION 7 CONCRETE ABUTMENTS, PIERS AND BENTS CONT.

Type	Region	Drawing number	Name	Span	Height	Width Roadway	Loading	Remarks	Page
	8	B-13706			16	19			208
	1	21			19-21	12			209
	1	11 ?			14-16	12			210
	1	135			16-18	12			211
	1	136			19-21	12			212
	1	155			18	19			213
	1	20 ?			16-18	12			214
Bent	1	34			9-14	12			215
	1	31			10-25	12			216
	1	35			10-25	12			217
	1	42			15-20	12			218
	1	59			21-26	12			219
	1	22			22-24	12			220
Pier	7	B-2501A			6-12	10-22			221
	7	B-3101			10-30	11	H-10		222
	7	B-3102			10-30	11	H-10		223
	7	B-3103			10-30	11	H-15		224
	7	B-3104			10-30	11	H-15		225
	7	B-9201			10-30	19			226
	7	B-13001			12-30	10			227
	7	B-13401			10-26	19			228
	1	36			11-25	12			229
	1	44			19-36	12			230

SECTION 8 MASONRY ABUTMENTS AND PIERS

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	8	B-14301			6-14				232
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	4				6-22	14-16			235

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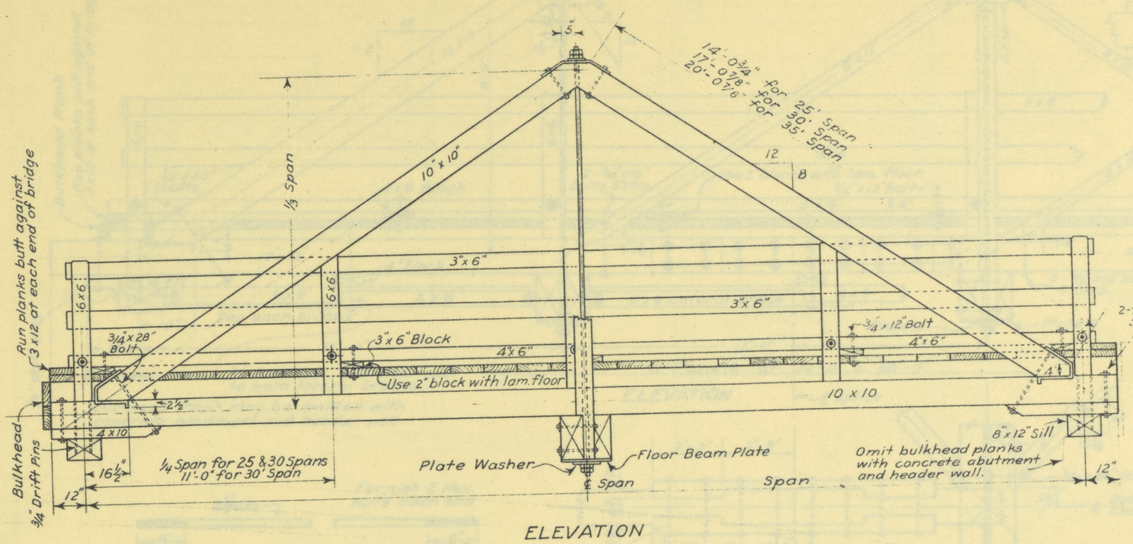
Type	Region	Drawing number	Name	Span	Height	Width Roadway	Loading	Remarks	Page
Pile	7	B-2801				11-19	10-T		236
Log Crib	8	B-3101				11			237
Log Crib	8	B-3102				11			238
Log Crib	8	B-7501B							239

SECTION 10 MISCELLANEOUS

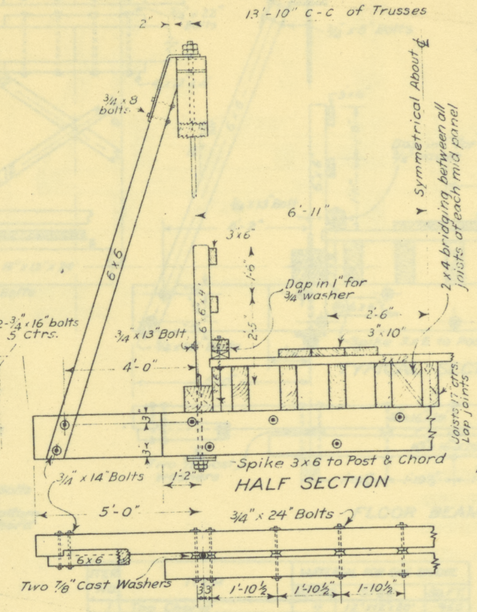
Concrete Culvert	1	180	Size 8 x 5	28					240
	8	C-601	Size variable	Var.					241
	9	22-B	Size variable	Var.					242
Masonry culvert	8	C-1501		5-10	3-8				243
	1	187		4-10	var.				244
Metal arch culvert	9	22-C							245
Guard rail	8	B-6401A							246
	8	B-6403							247
	8	B-6402G							248
	8	M-701							249

SECTION 1

TIMBER BRIDGES



ELEVATION



HALF SECTION

FLOOR BEAM

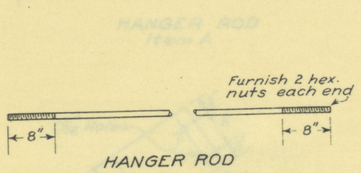
Leave 3/4" space between 3 x 12 floor planks.
For heavy traffic, floor should be 2 x 4 on edge with 3/4 inch asphalt surface.
Run plank to be fastened to floor with two 5/8 inch lag screws in each board every 4 feet.
Bolt holes to be drilled with bit 1/16 inch smaller than diameter of bolt.
All truss joints and contact surfaces should be treated with creosote or asphaltic paint before assembling.
Design Stresses :- Bending, 1000 lbs. per sq. in., shear parallel to grain, 90 lbs. per sq. in.

SUITABLE TIMBER FOR MEMBERS LISTED IN BILL OF MATERIAL

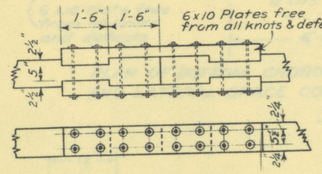
Species	Grade
Douglas Fir	Common Structural
Hemlock (West Coast)	Select Structural
Larch	Common Structural
Redwood	Select Structural
Southern Yellow Pine	No. 1 Common
Southern Cypress	Select Structural
Oak (Red or White)	Common Structural

FLOOR JOISTS AND BEAMS FOR VARIOUS BENDING STRESSES

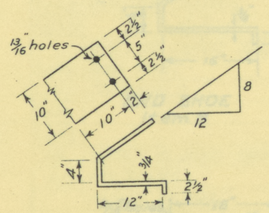
ALLOWABLE BENDING STRESS	H 10 LOADING				H 15 LOADING			
	Floor Joists			Floor Beam	Floor Joists			Floor Beam
	25 Ft. Span	30 Ft. Span	35 Ft. Span		25 Ft. Span	30 Ft. Span	35 Ft. Span	
900	4 x 14	6 x 14	6 x 14	10 x 14	6 x 14	6 x 16	8 x 16	10 x 16
1000	4 x 14	6 x 14	6 x 14	10 x 14	6 x 14	6 x 16	6 x 16	10 x 16
1100	4 x 14	6 x 14	6 x 14	8 x 14	6 x 14	6 x 14	6 x 16	10 x 16
1200	4 x 14	4 x 14	6 x 14	8 x 14	6 x 14	6 x 14	6 x 16	10 x 16
1300	4 x 12	4 x 14	6 x 14	8 x 14	6 x 14	6 x 14	6 x 14	8 x 16
1400	4 x 12	4 x 14	4 x 14	8 x 14	4 x 14	6 x 14	6 x 14	8 x 16
1500	4 x 12	4 x 14	4 x 14	6 x 14	4 x 14	6 x 14	6 x 14	8 x 16



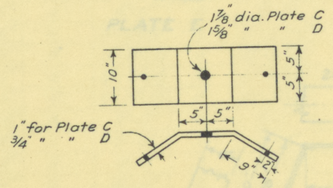
HANGER ROD



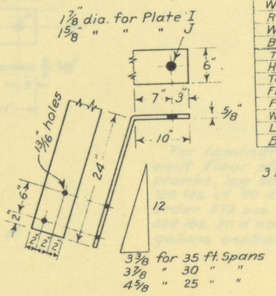
BOTTOM CHORD SPICE TO BE USED IF LONG TIMBERS ARE NOT AVAILABLE



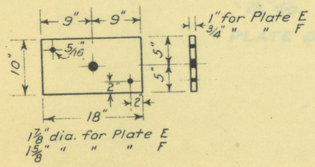
END SHOE PLATE B



TOP PLATE PLATES C & D



WIND BRACE PLATE PLATE I & J



FLOOR BEAM PLATE PLATES E & F

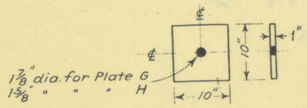


PLATE WASHER PLATE G & H

MATERIAL FOR ONE BRIDGE COMMON TO ALL SPANS AND LOADING

ITEM	NO. REQ.	SIZE	ITEM	NO. REQ.	SIZE	ITEM	NO. REQ.	SIZE
Sill	2	8"x12"x16'	Bolts - End Shoe	8	3/4" x 28	Bolts - Rail Posts	10	3/4 x 13
Sill Filler	2	4"x12"x16'	" Bolster	8	3/4" x 16	Mall. Iron Washers	100	3/4"
Blocks-Whl. Gd & Posts	3	3"x 6"x10'	" Top Plate	4	3/4" x 12	Cast " "	20	7/8"
Rail Posts	5	6"x 6"x10'	" Floor Beam	10	3/4" x 24	Nails	80 #	60 d
Bolster	1	4"x10"x14'	" Wind Brace	4	3/4" x 14	Drift Pins	8	3/4"x18
Bridging	3	2"x 4"x16'	" "	4	3/4" x 8	End Shoe	4	Plate B

ADDITIONAL MATERIAL FOR ONE BRIDGE FOR SPAN AND LOADING AS SHOWN

ITEM	H 10 LOADING						H 15 LOADING					
	25 FT. SPAN		30 FT. SPAN		35 FT. SPAN		25 FT. SPAN		30 FT. SPAN		35 FT. SPAN	
	NO. REQ.		NO. REQ.		NO. REQ.		NO. REQ.		NO. REQ.		NO. REQ.	
Posts	4	10"x10"x16'	4	10"x10"x18'	4	10"x10"x22'	4	10"x10"x16'	4	10"x10"x18'	4	10"x10"x22'
Chord	2	10"x10"x28'	2	10"x10"x32'	2	10"x10"x36'	2	10"x10"x28'	2	10"x10"x32'	2	10"x10"x36'
Floor Beam	2	10"x14"x20'	2	10"x14"x20'	2	10"x14"x20'	2	10"x16"x20'	2	10"x16"x20'	2	10"x16"x20'
" Joist	18	4"x14"x14'	18	6"x14"x18'	18	6"x14"x20'	18	6"x14"x20'	18	6"x14"x18'	18	6"x16"x20'
" Planks	29	3"x12"x14'	34	3"x12"x14"	39	3"x12"x14'	29	3"x12"x14'	34	3"x12"x14'	39	3"x12"x14'
Run Planks	12	3"x10"x14'	12	3"x10"x16'	12	3"x10"x12'	12	3"x10"x14'	12	3"x10"x16'	12	3"x10"x12'
Wheel Guard	4	4"x 6"x14'	4	4"x 6"x16'	6	4"x 6"x14'	4	4"x 6"x14'	4	4"x 6"x16'	6	4"x 6"x14'
Railing	8	3"x 6"x14'	8	3"x 6"x16'	8	3"x 6"x18'	8	3"x 6"x14'	8	3"x 6"x16'	8	3"x 6"x18'
Wind Brace	2	6"x 6"x12'	2	6"x 6"x14'	2	6"x 6"x16'	2	6"x 6"x12'	2	6"x 6"x14'	2	6"x 6"x16'
Bulkhead	2	3"x14"x14'	2	3"x14"x14'	2	3"x14"x14'	2	3"x14"x14'	2	3"x14"x14'	2	3"x14"x14'
TOTAL BD. FT.		5388		6936		7767		6042		7340		9167
Hanger Rod	2	1 1/2"x11'-0"	2	1 1/2"x12'-8"	2	1 1/2"x14'-8"	2	1 3/4"x11'-4"	2	1 3/4"x13'-0"	2	1 3/4"x14'-8"
Top Plate	2	Plate D	2	Plate D	2	Plate D	2	Plate C	2	Plate C	2	Plate C
Floor Beam Plate	2	" F	2	" F	2	" F	2	" E	2	" E	2	" E
Plate Washer	2	" H	2	" H	2	" H	2	" G	2	" G	2	" G
Wind Brace Plate	2	" J	2	" J	2	" J	2	" I	2	" I	2	" I
Lag Sc. & 1/2" Cut Wash.	100	1/2" x 5 1/2"	125	1/2" x 5 1/2"	150	1/2" x 5 1/2"	100	1/2" x 5 1/2"	125	1/2" x 5 1/2"	150	1/2" x 5 1/2"
Bolts - Wheel gd.	10	3/4"x12"	10	3/4"x12"	14	3/4"x12"	10	3/4"x12"	10	3/4"x12"	14	3/4"x12"

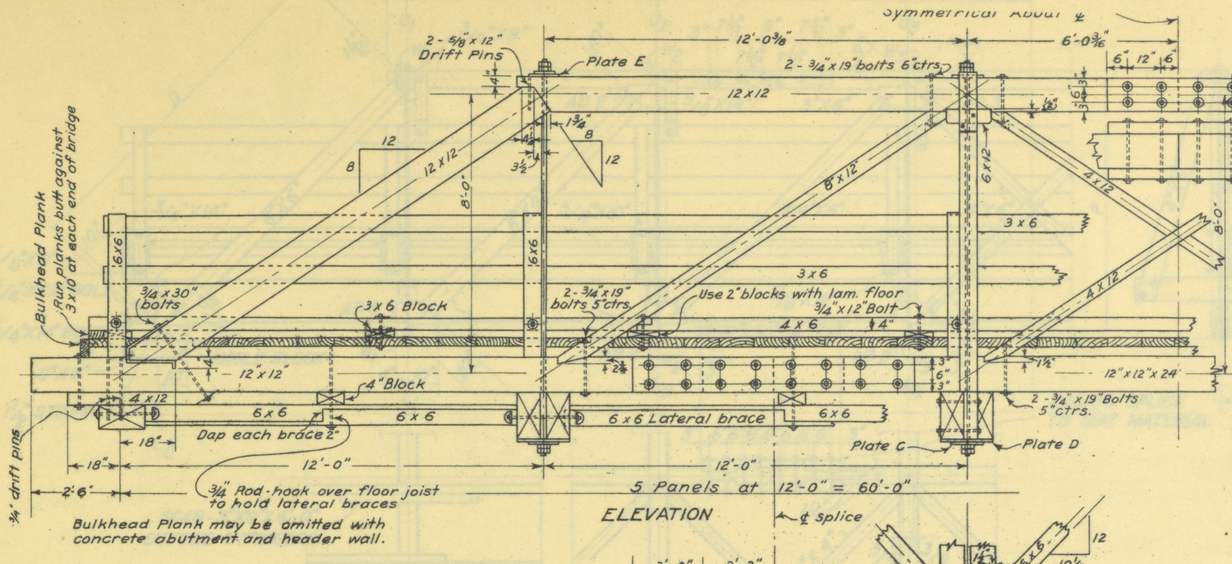
For laminated floor, omit floor planks, run planks, lag screws & 50 lbs. of 60 d nails, and order 6 pieces 2"x4"x14', 3 lbs. of 30 d nails and 1 gallon asphalt for each lineal foot of bridge.

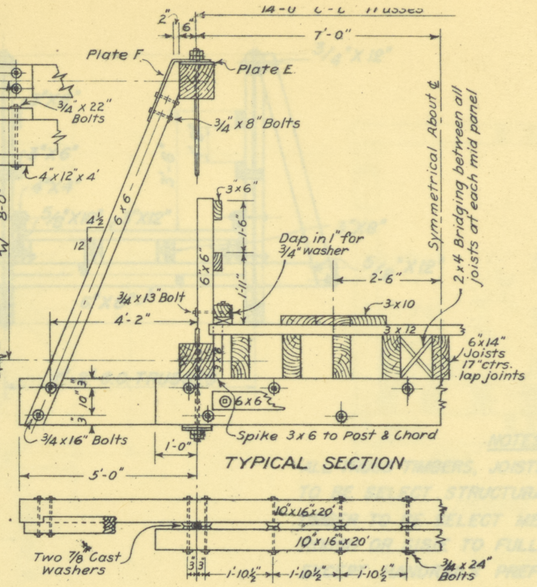
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

KING POST TRUSS
25, 30, & 35 FT. SPANS

LOADING H 10 AND H 15
1/2" & 1" = 1'-0"

WASHINGTON, D.C.
MARCH 1932





Leave 3/4" space between 3 x 12 floor planks.

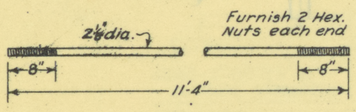
For heavy traffic, floor should be 2 x 4's on edge with 3/8 inch asphalt surface.

Run plank to be fastened to floor with two 5½ inch lag screws in each board every 4 feet.

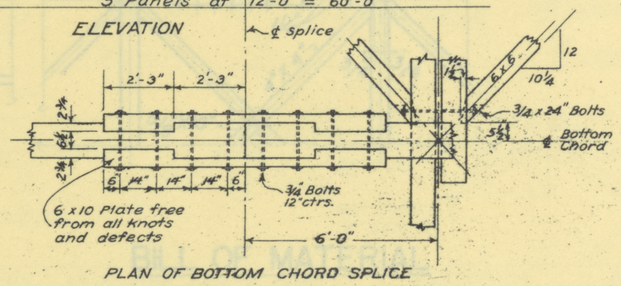
Bolt holes to be drilled with bit 1/16" smaller than diameter of bolt.

All truss joints and contact surfaces should be treated with creosote or asphaltic paint before assembling.

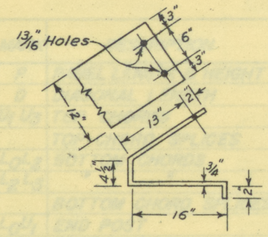
Design Stresses :- Bending 1000 lbs. per sq. in., Shear parallel to grain, 90 lbs. per square inch, except bottom chord and splice to be select structural timbers, tension 1300 lbs. per sq. in., shear parallel to grain 120 lbs. per sq. in.



HANGER ROD
Item A



PLAN OF BOTTOM CHORD SPLICE AND LATERAL BRACE CONNECTION



END SHOE
Item B

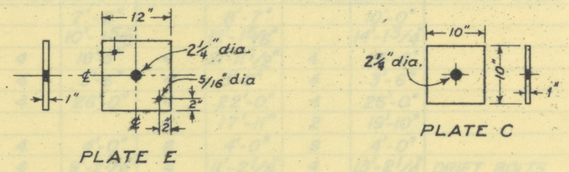


PLATE E

PLATE C

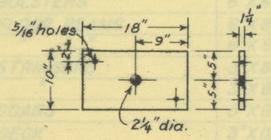


PLATE D

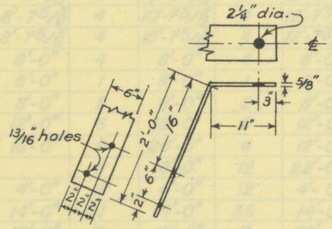


PLATE F

For laminated floor, omit floor planks, run planks, lag screws and 100 lbs. of 60 d nails. Order 372 pcs. 2" x 4" x 14 ft., 200 lbs. 30 d nails and 70 gallons asphalt.

ITEM NO.	ITEM	MATERIAL FOR ONE BRIDGE NO. REQ.	SIZE	BD. FT.
1	Top Chord	4	12"x12"x20'	960
2	Top Chord Splice	1	4"x12"x16'	64
3	Bottom Chord	4	12"x12"x22'	1056
4	Bottom Chord	2	12"x12"x24'	576
5	Bottom Chord Splice	4	6"x12"x18'	432
6	End Posts	4	12"x12"x14'	672
7	Diagonals	4	8"x12"x14'	448
8	"	4	4"x12"x14'	224
9	Bolsters	1	4"x12"x18'	72
10	Sills	2	8"x16"x16'	341
11	Sill Fillers	2	4"x12"x14'	112
12	Floor Beams	8	10"x16"x20'	2136
13	Floor Joists	45	6"x14"x14'	4410
14	Floor Planks	62	3"x12"x14'	2604
15	Run Planks	26	3"x10"x16'	1040
16	Wheel Guard	8	4"x6"x16'	256
17	" " Blocks	1	3"x6"x16'	24
18	Rail Posts	4	6"x6"x12'	144
19	Railing & 3 x 6 for Posts	14	3"x6"x12'	252
20	"	4	3"x6"x14'	84
21	Lateral Braces	10	6"x6"x18'	540
22	End Bulkhead	2	3"x14"x14'	98
23	Wind Braces	8	6"x6"x12'	288
24	Bridging	7	2"x4"x16'	75
			TOTAL	16,908
	HARDWARE			WT.
A	Hanger Rod	8	2⅛"x11'-5"	1200
B	End Shoe	4	3/4"x12"x38"	516
C	Plate Washer	8	1"x10"x10"	227
D	Floor Beam Plate	8	1"x10"x18"	510
E	Top Chord Plate	8	1"x10"x10"	227
F	Wind Brace Plate	8	5/8"x6"x35"	297
	Bolts - Shoe	8	3/4" x 30"	33
	" Lat. Braces	8	3/4" x 24"	27
	" "	4	3/4" x 21"	12
	" Floor Beams	40	3/4" x 24"	136
	" Top Splice	16	3/4" x 22"	51
	" Bottom Splice	64	3/4" x 20"	189
	" Diagonals	32	3/4" x 19"	88
	" Bolster	8	3/4" x 18"	21
	" Wind Brace	16	3/4" x 16"	39
	" "	16	3/4" x 8"	23
	" Wheel Guard	20	3/4" x 12"	38
	" Rail Posts	12	3/4" x 13"	24
	Mall. Iron Washers	430	3/4"	150
	Cast " "	80	7/8"	110
	Drift Pins	8	3/4" x 20"	20
	" "	8	5/8" x 12"	8
	Hook Bolts for Lat. braces - 3/4" Rod Thread one end	5	3/4" x 36"	23
	Nails	150 #	60 d	150
	Lag Screws	240	1/2 x 5½	72
	Cut Washers	10 #	1/2"	10
			TOTAL	4,223

FLOOR JOISTS AND BEAMS FOR VARIOUS BENDING STRESSES

ALLOWABLE BENDING STRESS	SIZE REQUIRED JOISTS	BEAMS
900	6 x 14	10 x 16
1000	6 x 14	10 x 16
1100	6 x 14	10 x 16
1200	6 x 14	8 x 16
1300	4 x 14	8 x 16
1400	4 x 14	8 x 16
1500	4 x 14	8 x 14

SUITABLE TIMBER FOR LOWER CHORD & SPLICE

Species	Grade
Douglas Fir	Structural
Southern Yellow Pine	Structural
Larch	Structural
Redwood	Select Structural

SUITABLE TIMBER FOR MEMBERS LISTED IN BILL OF MATERIAL EXCEPT LOWER CHORD & SPLICE

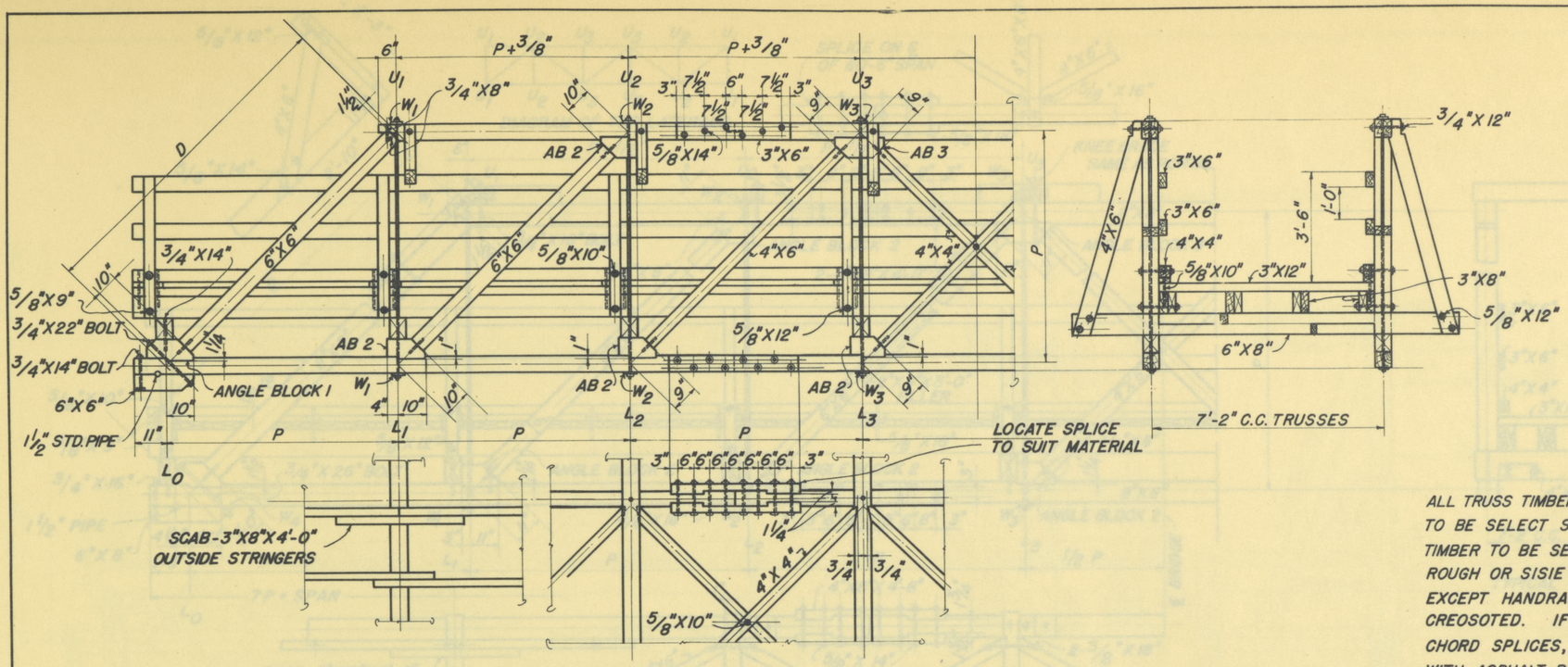
Douglas Fir	Common Structural
Hemlock (West Coast)	Select Structural
Larch	Common Structural
Redwood	Select Structural
Southern Yellow Pine	No. 1 Common
Southern Cypress	Select Structural
Oak (Red or White)	Common ~~Structural~~

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

60 FT. SPAN TIMBER BRIDGE

LOADING H 15

WASHINGTON, D.C.
MARCH 1932



BILL OF MATERIAL

MARK	DESCRIPTION	SIZE	50'-2" SPAN NO. REQ.	50'-2" SPAN LENGTH	60'-1" SPAN NO. REQ.	60'-1" SPAN LENGTH	70'-0" SPAN NO. REQ.	70'-0" SPAN LENGTH
P	PANEL LENGTH & HEIGHT			7'-2"		8'-7"		10'-0"
D	DIAGONAL LENGTH			10'-15⅝"		12'-15⅝"		14'-13¾"
U_1 U_3	TOP CHORDS	6"X6"	4	18'-5"	4	21'-11½"	4	25'-6"
	TOP CHORD SPLICES	3"X6"	4	3'-6"	4	3'-6"	4	3'-6"
L_0L_2	BOTTOM CHORDS	6"X6"	4	26'-0"	4	22'-0"	4	26'-0"
L_2L_3	" "	6"X6"			2	17'-11"	2	19'-10"
	BOTTOM CHORD SPLICES	3"X6"	4	4'-0"	8	4'-0"	8	4'-0"
L_0U_1	END POST	6"X6"	4	9'-2⅛"	4	11'-2⅛"	4	13'-2¼"
L_1U_2	DIAGONALS	6"X6"	4	8'-5⅝"	4	10'-5⅝"	4	12'-5¾"
L_2U_3	"	4"X6"	4	8'-7⅝"	4	10'-7⅝"	4	12'-7¾"
L_3U_3	"	4"X4"	4	8'-7⅝"	4	10'-7⅝"	4	12'-7¾"
AB	ANGLE BLOCKS - MATERIAL	6"X8"	4	8'-0"	4	8'-0"	4	8'-0"
L_0	BOLSTERS	6"X6"	1	8'-0"	1	8'-0"	1	8'-0"
	FLOOR BEAMS	6"X8"	2	8'-0"	2	8'-0"	2	8'-0"
	" "	6"X8"	6	12'-0"	6	12'-0"	6	12'-0"
	STRINGERS	3"X8"	14	16'-0"	6	20'-0"	4	12'-0"
	"	3"X8"			8	18'-0"	12	22'-0"
	SCABS	3"X8"	12	4'-0"	12	4'-0"	12	4'-0"
	DECK	3"X12"	26	14'-0"	31	14'-0"	36	14'-0"
	GUARD RAIL	4"X4"	7	16'-0"	7	18'-0"	7	22'-0"
	HAND RAIL	3"X6"	14	16'-0"	14	18'-0"	14	22'-0"
	HAND RAIL POSTS	4"X4"	3	18'-0"	3	18'-0"	3	18'-0"
	BOTTOM LATERALS	4"X4"	14	10'-0"	14	12'-0"	14	12'-0"
	KNEE BRACES	4"X6"	6	14'-0"	6	14'-0"	6	14'-0"
L_1U_1	VERTICAL RODS-ROUNDS		4	1"X8'-2"	4	1⅛"X9'-7"	4	1¼"X11'-1"
L_2U_2	" " "		4	⅞"X8'-2"	4	1"X 9'-7"	4	1"X 11'-1"
L_3U_3	" " "		4	¾"X8'-2"	4	⅞"X9'-7"	4	⅞"X11'-1"
	TOTAL LUMBER - F.B.M.			3800		4348		4974
	TOTAL HARDWARE - LBS.			830		940		1020

BILL OF TRUSS RODS

DESCRIPTION	NO. REQ.	SIZE
MACHINE BOLTS - SQ. HD. & NUTS	6	5/8"X9"
	18	5/8"X10"
	65	5/8"X12"
	12	5/8"X14"
	13	3/4"X12"
	4	3/4"X14"
	30	3/4"X18"
	4	3/4"X22"
DRIFT BOLTS	36	3/4"X8"
	4	3/4"X14"
	22	5/8"X10"
1½" STD. PIPE	4	0'-6"
PL. WASHERS - W_1	8	6"X5/8"X0'-6"
" " - W_2	8	5"X1/2"X0'-5"
" " - W_3	16	4"X3/8"X0'-4"
60D SPIKES	125 #	
MALL. WASHERS	210	5/8"
" "	110	5/8"

NOTES

ALL TRUSS TIMBERS, JOISTS AND FLOOR BEAMS TO BE SELECT STRUCTURAL AND ALL OTHER TIMBER TO BE SELECT MERCHANTABLE, EITHER ROUGH OR SISIE TO FULL SIZE. ALL LUMBER EXCEPT HANDRAILS PREFERABLY PRESSURE CREOSOTED. IF NOT SO TREATED, PROTECT CHORD SPLICES, FLOOR BEAMS AND STRINGERS WITH ASPHALT ROOFING WEIGHING 55 LB. OR MORE PER 100 SQ. FT. AND DAUB JOINTS AND DIP ANGLE BLOCKS IN BOILING CREOSOTE. ANGLE BLOCKS TO BE SELECT LUMBER SEASONED BEFORE FRAMING.

LAY DECK WITH ½" SPACING. USE 2-60D SPIKES AT EACH END AND ONE IN EACH INTERMEDIATE STRINGER.

INCREASE THE NUMBER OF SPLICES IF SHORTER CHORD MEMBERS ARE DESIRED.

BORE HOLES 1/16" OVERSIZE FOR BOLTS, ⅛" OVERSIZE FOR TRUSS RODS, AND 1/16" UNDERSIZE FOR DRIFT BOLTS.

DESIGNED FOR 5 FT. OF SNOW.
SNOW LIVE LOAD = 350# PER LINEAL FT. OF BRIDGE.

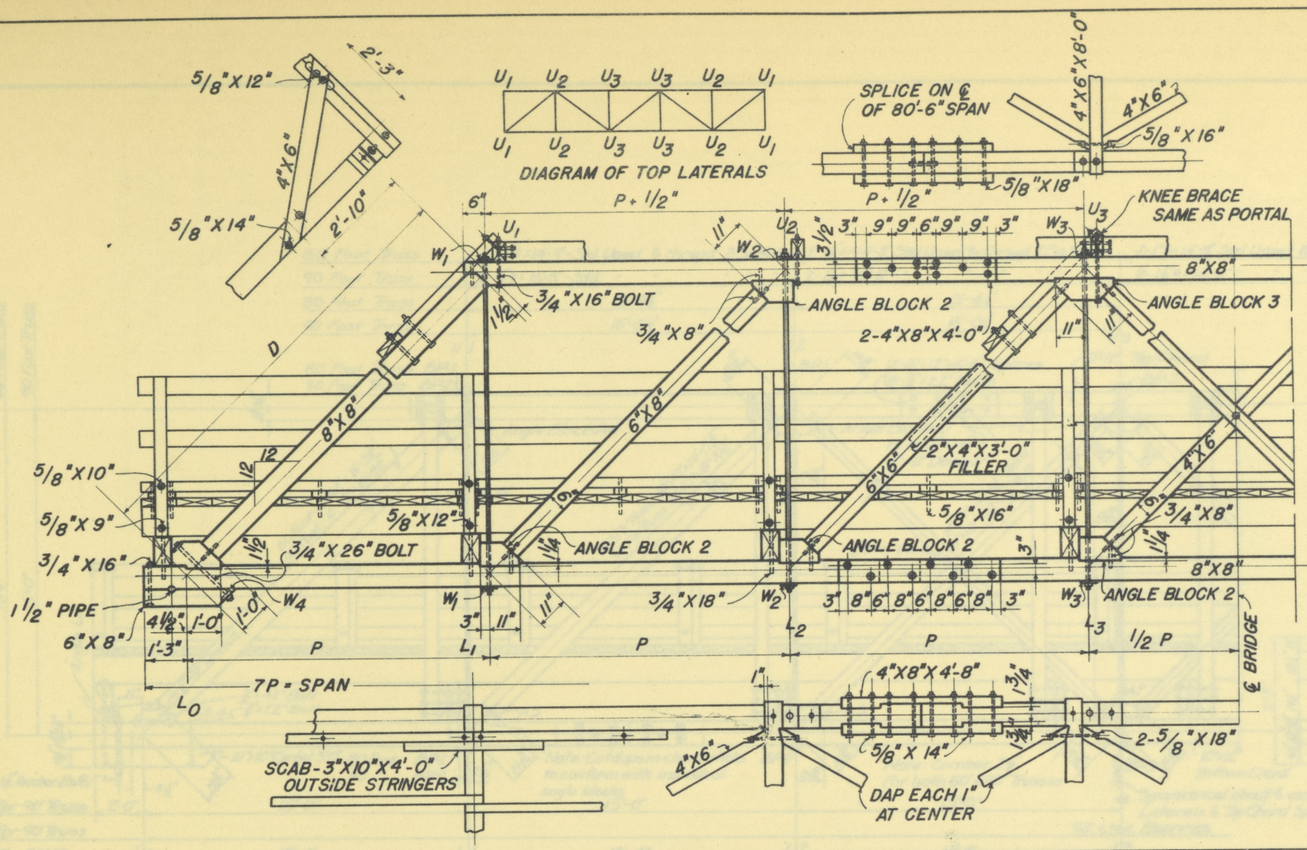
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

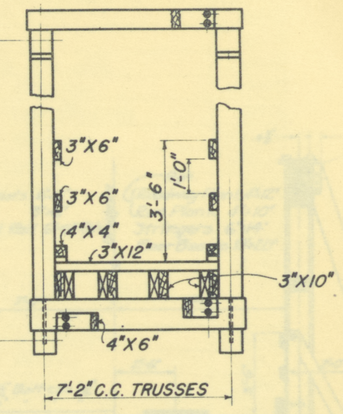
TIMBER HOWE TRUSS

50-60 & 70 FT. SPANS
6 FT. ROADWAY
HORSE TRAIL

DESIGNED BY R.W.L. FEB. 1935

5-M-44





TYPICAL SECTION

MARK	DESCRIPTION	SIZE	80'-6" SPAN NO. REQ.	80'-6" SPAN LENGTH	89'-10" SPAN NO. REQ.	89'-10" SPAN LENGTH	100'-4" SPAN NO. REQ.	100'-4" SPAN LENGTH
P	PANEL LENGTH & HEIGHT			11'-6"		12'-10"		14'-4"
D	DIAGONAL LENGTH			16'-3"		18'-1 3/4"		20'-3 1/4"
U_1U_2	TOP CHORDS	8"X8"	4	29'-3 3/4"	6	21'-9 1/2"	4	24'-0"
	" "						2	24'-8"
	TOP SPLICES	4"X8"	4	4'-0"	8	4'-0"	8	4'-0"
L_0L_2	BOTTOM CHORDS	8"X8"	4	28'-0"	4	32'-0"	4	34'-0"
L_2L_3	" "	8"X8"	2	27'-0"	2	28'-4"	2	34'-10"
	BOTTOM SPLICES	4"X8"	8	4'-8"	8	4'-8"	8	4'-8"
L_0U_1	END POST	8"X8"	4	15'-1 1/2"	4	17'-0 1/4"	4	19'-1 3/4"
L_1U_2	DIAGONALS	6"X8"	4	14'-5"	4	16'-3 3/4"	4	18'-5 1/4"
L_2U_3	"	6"X6"	4	14'-5"	4	16'-3 3/4"	4	18'-5 1/4"
L_3U_3	"	4"X6"	4	14'-5"	4	16'-3 3/4"	4	18'-5 1/4"
AB	ANGLE BLOCKS - MATERIAL 8"X12"		2	16'-0"	2	16'-0"	2	16'-0"
L_0	BOLSTERS	6"X8"	1	12'-0"	1	12'-0"	1	12'-0"
	FLOOR BEAMS	5"X10"	8	8'-0"	8	8'-0"	8	8'-0"
	STRINGERS	3"X10"	12	14'-0"	28	14'-0"	28	16'-0"
	"	3"X10"	16	12'-0"				
	SCABS	3"X10"	12	4'-0"	12	4'-0"	12	4'-0"
	DECK	3"X12"	42	14'-0"	46	14'-0"	52	14'-0"
	GUARD RAIL	4"X4"	14	12'-0"	14	14'-0"	14	16'-0"
	HAND RAIL	3"X6"	12	14'-0"	28	14'-0"	28	16'-0"
	" "	3"X6"	16	12'-0"				
	HAND RAIL POSTS	4"X4"	8	10'-0"	8	10'-0"	8	10'-0"
	TOP STRUTS	4"X6"	6	8'-0"	6	8'-0"	6	8'-0"
	TOP & BOTT. LATERALS	4"X6"	19	14'-0"	6	16'-0"	2	18'-0"
	" " "	4"X6"			13	14'-0"	17	16'-0"
	KNEE BRACES	4"X6"	4	12'-0"	4	12'-0"	4	12'-0"
L_1U_1	VERTICAL RODS-ROUNDS		4	1 1/4"X12'-9"	4	1 3/8"X14'-1"	4	1 3/8"X15'-7"
L_2U_2	" " "		4	1 1/8"X12'-9"	4	1 1/8"X14'-1"	4	1 1/4"X15'-7"
L_3U_3	" " "		4	7/8"X12'-8"	4	7/8"X14'-0"	4	1"X15'-6"
	TOTAL LUMBER - F.B.M.			7409		8065		8953
	TOTAL HARDWARE - LBS.			1430#		1560#		1700#

BILL OF TRUSS RODS

DESCRIPTION	NO. REQ.	SIZE
MACHINE BOLTS - SQ.HD. & NUTS	4	5/8"X9"
	18	X10"
	30	X12"
	64	X14"
	10	X16"
	76	5/8"X18"
	16	3/4"X16"
	4	3/4"X26"
DOWELS	56	3/4"X8"
	16	3/4"X18"
	44	5/8"X16"
1 1/2" STD. PIPE	4	0'-8" LONG
PL. WASHERS - W_1	8	6"X3/4"X0'-8"
" " - W_2	8	6"X5/8"X0'-6"
" " - W_3	16	5"X1/2"X0'-6"
" " - W_4	8	4"X3/8"X0'-4"
60D SPIKES	150#	
MALL. WASHERS	420	5/8"
" "	40	3/4"

NOTES

INCREASE THE NUMBER OF SPLICES IF SHORTER CHORD MEMBERS ARE DESIRED.

BORE HOLES 1/16" OVERSIZE FOR BOLTS, 1/8" OVERSIZE FOR TRUSS RODS, AND 1/16" UNDERSIZE FOR DRIFT PINS.

NOTES:

ALL TRUSS TIMBERS, JOISTS AND FLOOR BEAMS TO BE SELECT STRUCTURAL AND ALL OTHER TIMBER TO BE SELECT MERCHANTABLE, EITHER ROUGH OR SISIE TO FULL SIZE. ALL LUMBER EXCEPT HANDRAILS PREFERABLY PRESSURE CREOSOTED. IF NOT SO TREATED, PROTECT CHORD SPLICES, FLOOR BEAMS AND STRINGERS WITH ASPHALT ROOFING WEIGHING 55 LB. OR MORE PER 100 SQ.FT. AND DAUB JOINTS AND DIP ANGLE BLOCKS IN BOILING CREOSOTE. ANGLE BLOCKS TO BE SELECT LUMBER SEASONED BEFORE FRAMING.

LAY DECK WITH 1/2" SPACING. USE 2-60D SPIKES AT EACH END AND ONE IN EACH INTERMEDIATE STRINGER.

DESIGNED FOR 5 FT. OF SNOW.
SNOW LOAD = 350# PER LINEAL FT. OF BRIDGE.

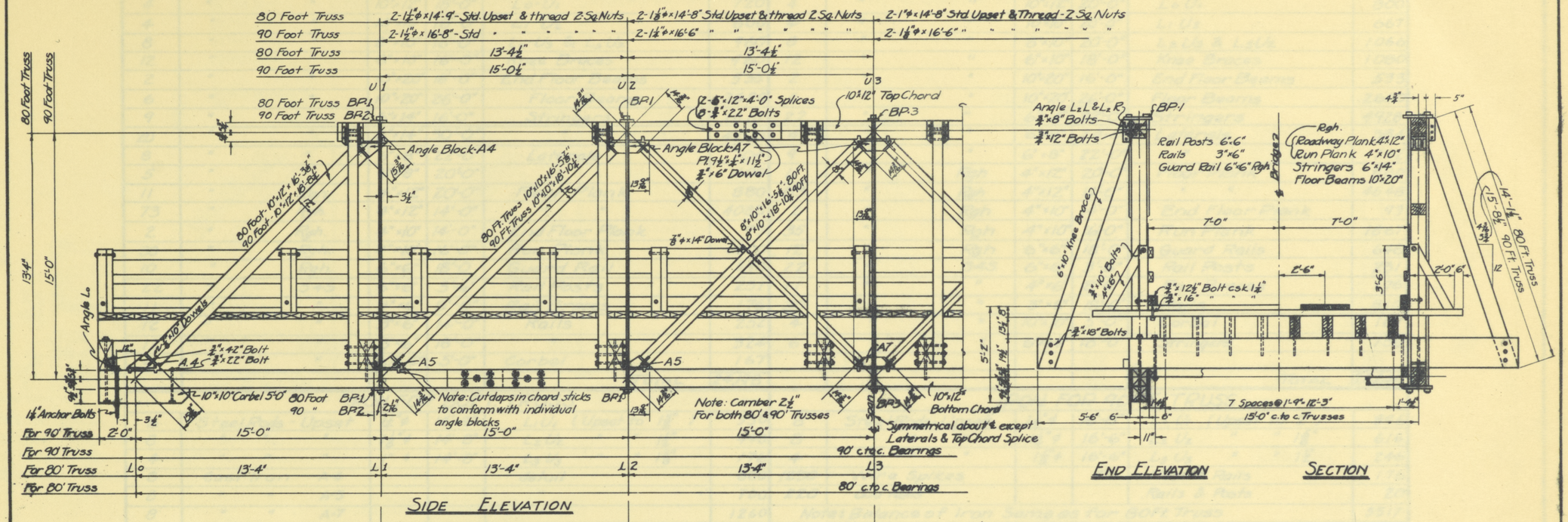
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

TIMBER HOWE TRUSS

80-90 & 100 FT. SPANS
6 FT. ROADWAY
HORSE TRAIL

DESIGNED BY R.W.L. FEB. 1935

5-M-45



NOTES

Roadway Plank: To be spiked to each stringer with two 7" wire spikes.
Run Plank: To have butts staggered and to be spiked at each end with two 7" wire spikes and one spike at approx. 2'-0" ctrs. on alternate sides.
Rail Posts to be bolted as shown and toe nailed at bottom with 60d nails. Rail post braces to be spiked with 7" wire spikes. Rails to be nailed to posts with 60d. nails. Butts to be staggered on posts.
All timber to be S4S unless otherwise noted.
All timber except rails, rail posts, rail braces, and run plank to be pressure treated with creosote. All treated timber to be fabricated before treatment.
All truss timbers, stringers & floor beams to be structural stringer grade. All other timber to be select common grade, Douglas Fir.
Bore 1⅛" hole for ⅞" Drift Bolts.
Washers to be standard malleable cast iron.
All iron to be galvanized.

· For Bills of Material see Sheet Two ·

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

STANDARD TREATED HOWE TRUSS 80 FT. & 90 FT. SPANS H-15 LOADING

JULY 25, 1935 — SCALE: ¾" = 1'-0"

DESIGNED BY: W.D.S. JULY 1933	APPROVED
REVISED BY: J.A.T. JULY 1935	
TRACED BY: J.A.T.	
CHECKED BY:	REGIONAL ENGINEER

SHEET 1 OF 2 SHEETS — I-P-7

80 FOOT TRUSS

NO.	MATERIAL	SIZE	LENGTH	LOCATION	F.B.M.
2	Fir S4S	10"x12"	22'-0"	Top Chord	440
2	" "	10"x12"	36'-0"	" "	720
4	" "	10"x12"	22'-0"	Bottom Chord	880
2	" "	10"x12"	40'-0"	" "	800
4	" "	5"x12"	16'-0"	T.C. & B.C. Splices	320
4	" "	10"x12"	18'-0"	L_0-U_1	720
4	" "	10"x10"	18'-0"	L_1-U_2	600
8	" "	8"x10"	18'-0"	L_2-U_3 & L_3 U_2	960
12	" "	6"x10"	16'-0"	Knee Braces	960
2	" "	10"x20"	16'-0"	End Floor Beams	533
6	" "	10"x20"	26'-0"	Floor Beams	2600
9	" "	6"x14"	16'-0"	Stringers	1010
20	" "	6"x14"	30'-0"	"	4200
8	" "	6"x8"	22'-0"	Laterals	704
5	" "	6"x8"	20'0"	"	400
11	" Rgh.	4"x12"	20'-0"	Floor Plank	880
73	" Rgh.	4"x12"	14'-0"	" "	4088
2	" Rgh.	4"x10"	14'-0"	End Floor Plank	93
30	" Rgh.	4"x10"	16'-0"	Run Plank	1600
10	" Rgh.	6"x6"	18'0	Guard Rail	540
22	" S4S	6"x6"	3'-6"	Rail Posts	231
11	" "	4"x6"	8'-0"	Rail Braces	176
12	" "	3"x6"	14'-0"	Rails	252
12	" "	3"x6"	18'-0"	"	324
4	" "	10"x10"	5'-0"	Corbel	167
				TOTAL	24,198

IRON FOR 80FT. TRUSS

8	Steel Rods - Upset	1¼"ϕ	14'-9"	L_1U_1 (Upset to 1⅝")	550
8	" " "	1⅛"ϕ	14'-8"	L_2U_2 " " 1½"	440
4	" " "	1" ϕ	14'-8"	L_3U_3 " " 1⅜"	176
8	Cast Iron A-4			detail	880
8	" " A-5			"	700
8	" " A-7			"	1260
16	Steel Plates BP-1	10"x⅞"	1'-5"	"	674
4	" " BP-3	8"x⅞"	1'-5"	"	135
2	" "	10"x1"	1'-0"	T.C. Splices	17
22	Machine Bolts	¾"	10"	Rail Posts	35
34	" "	"	12½"	Guard Rails	64
22	" "	"	16"	" "	51
36	" "	"	18"	Knee Braces	92
36	" "	"	8"	" "	48
48	" "	"	12"	Knee Brace Angles	87
60	" "	"	22"	T.C.-B.C. Splices & Corbel	181
4	" "	"	42"	Corbel	22
11	" "	"	34"	Laterals	50
6	" "	"	28"	"	24
6	" "	"	14"	"	13
8	" "	1¼"	3'-10"	Anchor Bolts	138
32	Steel Dowels	⅞"	10"	Diagonals	55
4	" "	"	14"	"	10
2	" "	"	6"	T.C. Splice	3
80	Drift Bolts	"	26"	Floor Beams & Stringers	353
450	Malleable C.I. Washers	¾"			150
1100	Wire Spikes		7"	Floor & Rails	156
220	60d Nails			Rails & Posts	20
24	Angles L_2L & L_2R	5"x3½"x⅝"	1'-2½"	Knee Brace Detail	252
4	Angles L_0	6"x4"x½"	16"	Anchor Angles	87
68	4" Split Rings			B.C. Splices & Laterals	46
				TOTAL #	6769

90 FOOT TRUSS

NO.	MATERIAL	SIZE	LENGTH	LOCATION	F.B.M.
2	Fir S4S	10"x12"	24'-0"	Top Chord	480
2	" "	10"x12"	40'-0"	" "	800
4	" "	10"x12"	28'-0"	Bottom Chord	1120
2	" "	10"x12"	40'-0"	" "	800
4	" "	5"x12"	16'-0"	T.C. & B.C. Splices	320
4	" "	10"x12"	20'-0"	L_0 U_1	800
4	" "	10"x10"	20'-0"	L_1 U_2	667
8	" "	8"x10"	20'-0"	L_2U_3 & L_3U_2	1066
12	" "	6"x10"	18'-0"	Knee Braces	1080
2	" "	10"x20"	16'-0"	End Floor Beams	533
6	" "	10"x20"	26'-0"	Floor Beams	2600
22	" "	6"x14"	32'-0"	Stringers	4928
4	" "	6"x8"	24'-0"	Laterals	384
9	" "	6"x8"	22'-0"	"	792
11	" Rgh	4"x12"	20'-0"	Floor Plank	880
83	" Rgh	4"x12"	14'-0"	" "	4648
2	" Rgh	4"x10"	14'-0"	End Floor Plank	93
35	" Rgh	4"x10"	16'-0"	Run Plank	1867
12	" Rgh	6"x6"	18'-0"	Guard Rails	648
22	" S4S	6"x6"	3'-6"	Rail Posts	231
11	" "	4"x6"	8'-0"	Rail Braces	176
30	" "	3"x6"	18'-0"	Rails	810
4	" "	10"x10"	5'-0"	Corbel	167
6	" "	6"x14"	18'-0"	Stringers	756
				TOTAL	26,646

IRON FOR 90FT. TRUSS

8	Steel Rods-Upset	1½"ϕ	16'-8"	L_1U_1 (Upset to 2")	896
8	" " "	1¼"ϕ	16'-6"	L_2U_2 " " 1⅝"	616
4	" " "	1⅛"ϕ	16'-6"	L_3U_3 " " 1½"	246
1230	Wire Spikes		7"	Floor & Rails	176
220	60d Nails			Rails & Posts	20
Note: Balance of Iron Same as for 80Ft. Truss					5517
				TOTAL #	7381

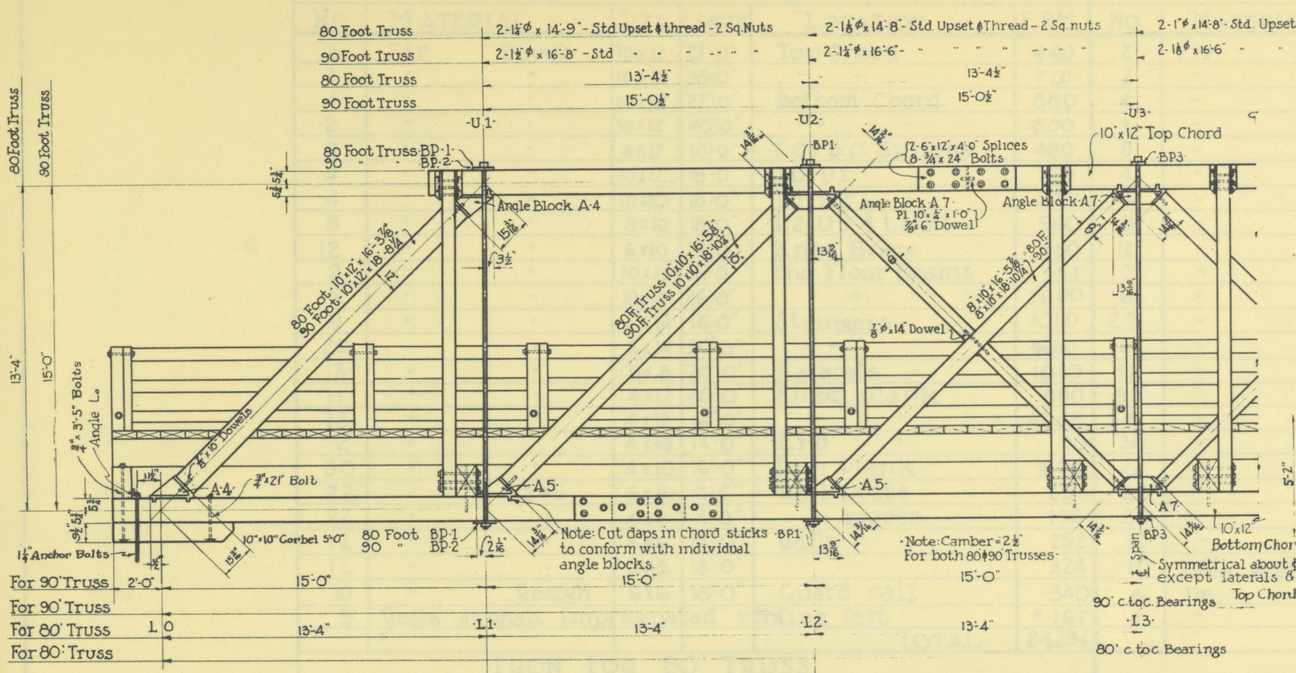
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

STANDARD TREATED HOWE TRUSS
80FT. & 90FT. SPANS
H-15 LOADING

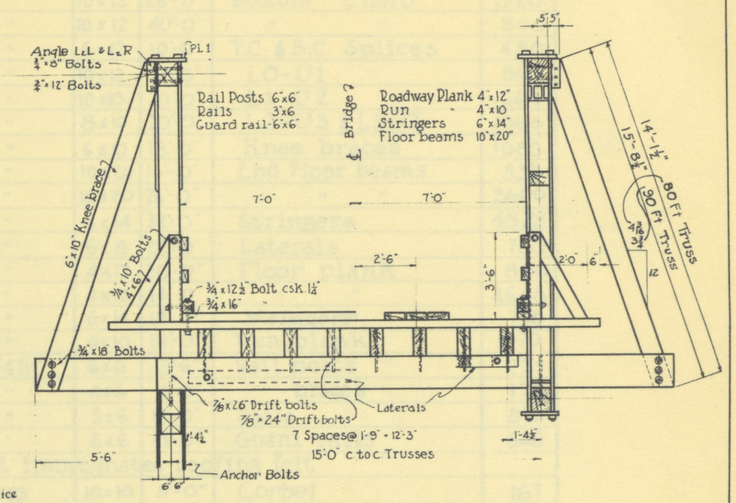
JULY 27, 1935 NO SCALE

DESIGNED BY: W.D.S. JULY 1933
REVISED BY: J.A.T. JULY 1935
TRACED BY: J.A.T.
CHECKED BY: [illegible]

APPROVED
[signature]
REGIONAL ENGINEER



·SIDE · ELEVATION·



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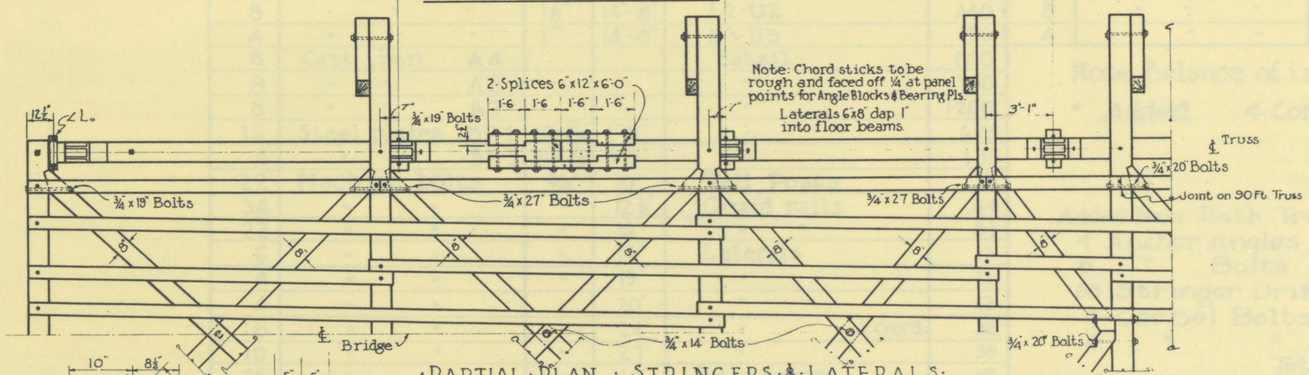
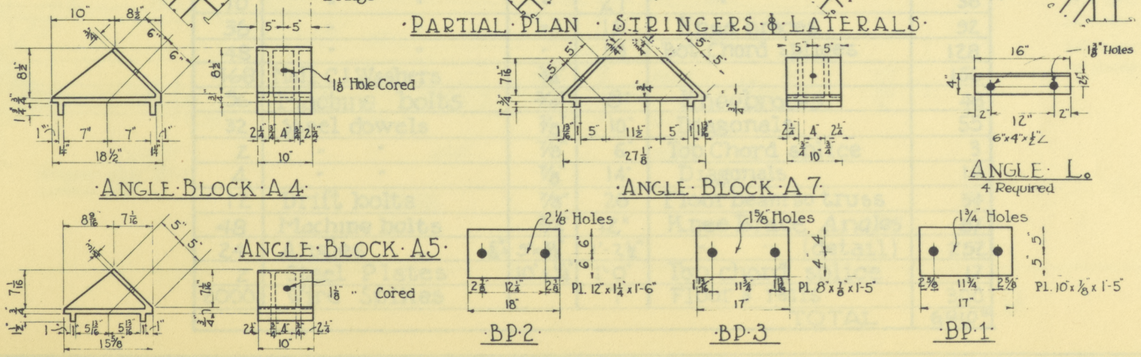


·PARTIAL · PLAN · STRINGERS · & · LATERALS·



·ANGLE·BLOCK·A4· ·ANGLE·BLOCK·A7· ·ANGLE· L₂
4 Required

·ANGLE·BLOCK·A5·

·BP·2· ·BP·3· ·BP·1·

ANGLE L₂R as shown
ANGLE L₂L opp hand
12 Each Required

·NOTES·

ROADWAY PLANK: To be spiked at each stringer with 2-7" wire spikes. Leave ½" space between planks. Runway plank to be spiked with 2-7" spikes at each end & 1-7" spike every two feet on alternate sides of plank.

DRIFT BOLTS: Bore 15/16" hole for ⅞" drift bolts.

ASPHALT PAPER: Tops of stringers and floor-beams to be covered with asphalt impregnated roofing felt bent down at sides to shed water. Width of felt to be 12" for stringers & 18" for floor beams.

ANGLE BLOCKS: All angle blocks & bearing plates to be set in thick paste of white lead and oil.

GRADE: All truss timbers, joists & floor beams to be structural stringer grade. All other timber to be select common grade, Douglas fir.

·For Bills of Material see Sheet Two·

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

TIMBER HOWE TRUSS

80 FT. & 90 FT. SPANS
H-15 LOADING

SHEET ONE OF TWO SHEETS

Revised By { J.A.T. Dec. 20, 1935. J.A.T. July 19, 1935 } DESIGNED BY W.D.S. JULY 1933

I-P-8

80 FOOT TRUSS

No.	Material	Size	Length	Location	F.BM
2	Fir Rough	10x12	22'-0"	Top Chord	440
2	" "	10x12	36-0"	" "	720
4	" "	10x12	22'-0"	Bottom Chord	880
2	" "	10x12	40'-0"	" "	800
8	" "	6x12	10'-0"	T.C & B.C. Splices	480
4	" "	10x12	18'-0"	L0-U1	720
4	" "	10x10	18'-0"	L1-U2	600
8	" "	8x10	18'-0"	L2-U3 & L3-U2	960
12	" "	6x10	16'-0"	Knee Brace	960
2	" "	10x20	16'-0"	End Floor Beams	533
6	" "	10x20	26'-0"	" "	2600
9	" "	6x14	16'-0"	Stringers	1010
20	" "	6x14	30'-0"	"	4200
13	" "	6x8	20'-0"	Laterals	1040
11	" "	4x12	20'-0"	Floor plank	880
73	" "	4x12	14'-0"	" "	4088
2	" "	4x10	14'-0"	End "	93
30	" "	4x10	16'-0"	Run Plank	1600
22	" S4S	6x6	3'-6"	Rail posts	231
22	" "	4x6	4'-0"	" braces	176
12	" "	3x6	14'-0"	Rails	252
12	" "	3x6	18'-0"	"	324
10	" Rough	6x6	18'-0"	Guard rail	540
9	Rolls asphalt impregnated roofing felt				* 167
	*			TOTAL	24,294

IRON FOR 80' TRUSS

8	Steel rods-Upset	1¼ ø	14'-9"	L1-U1	550#
8	" " "	1⅛"	14'-8"	L2-U2	440
4	" " "	1"	14'-8"	L3-U3	176
8	Cast iron A4			detail	880
8	" " A5			"	700
8	" " A7			"	1260
16	Steel plates -BP-1-	10"x⅞"	1'-5"	"	675
4	" " -BP-3-	8"x⅞"	1'-5"	"	135
22	Machine bolts	¾"	10"	Rail Posts	35
34	" "	"	12½"	Guard rails	64
22	" "	"	16"	" "	51
6	" "	"	14"	Laterals	13
4	" "	"	19"	"	11
4	" "	"	20"	"	12
16	" "	"	24"	" T.Chord	52
10	" "	"	27"	"	36
36	" "	"	18	Knee braces	92
48	" "	"	19	Bot. Chord splices	128
468	Mall. C.I. Washers	¾"			156
36	Machine bolts	¾"	8"	Kneebraces	48
32	Steel dowels	⅞"	10"	Diagonals	55
2	" "	⅞"	6"	Top Chord splice	3
4	" "	⅞"	14"	Diagonals	10
12	Drift bolts	⅞"	26"	Floor beam to truss	54
48	Machine bolts	¾"	12"	Knee Brace Angles	87
24	Angles 5/16"	5"x3½"	1'-2½"	" " (detail)	252
2	Steel Plates	10"x¼"	1'-0"	Top chord splice	17
2000	Wire Spikes		7"	Floor & rails	300
				TOTAL	6910#

90 FOOT TRUSS

No.	Material	Size	Length	Location	F.BM.
2	Fir Rough	10x12	24'-0"	Top Chord	480
2	" "	10x12	40'-0"	" "	800
4	" "	10x12	28'-0"	Bottom Chord	1120
2	" "	10x12	40'-0"	" "	800
8	" "	6x12	10'-0"	T.C. & B.C. Splices	480
4	" "	10x12	20'-0"	L0-U1	800
4	" "	10x10	20'-0"	L1-U2	667
8	" "	8x10	20'-0"	L2-U3 & L3-U2	1066
12	" "	6x10	18'-0"	Knee braces	1080
2	" "	10x20	16'-0"	End Floor beams	533
6	" "	10x20	26'-0"	" "	2600
22	" "	6x14	32'-0"	Stringers	4928
9	" "	6x8	20'-0"	Laterals	720
11	" "	4x12	20'-0"	Floor plank	880
83	" "	4x12	14'-0"	" "	4648
6	" "	6x14	18'-0"	Stringers	756
37	" "	4x10	16'-0"	Run plank	1970
22	" S4S	6x6	3'-6"	Rail posts	231
22	" "	4x6	4'-0"	" braces	176
30	" "	3x6	18'-0"	Rails	810
12	" "	6x6	18'-0"	Guard rails	648
10	rolls asphalt impregnated roofing felt				
4	Fir S4S	10x10	5'-0"	Corbel	167
4	" Rough	6x8	24'-0"	Laterals	384
				TOTAL	26744

IRON FOR 90' TRUSS

8	Steel rods-upset	1½" ø	16'-8"	L1-U1	896#
8	" " "	1¼"	16'-6"	L2-U2	616
4	" " "	1⅛"	16'-6"	L3-U3	246
				TOTAL	7,502#

Note: Balance of iron same as for 80 foot truss.

* Added 4 Corbels Fir S4S 10"x10"x5'-0" -167 F.BM.

Added Iron Both Trusses:

4 Anchor Angles	6"x4"x½"	- 16"	- 87#
8 " Bolts	1¼"	- 3'-10"	- 137#
68 Stringer Drift Bolts	⅞"	- 2'-0"	278#
4 Corbel Bolts	¾"	- 3'-5"	- 22#
4 " "	¾"	- 2'1"	- 12#
Total (Included above)			536#

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

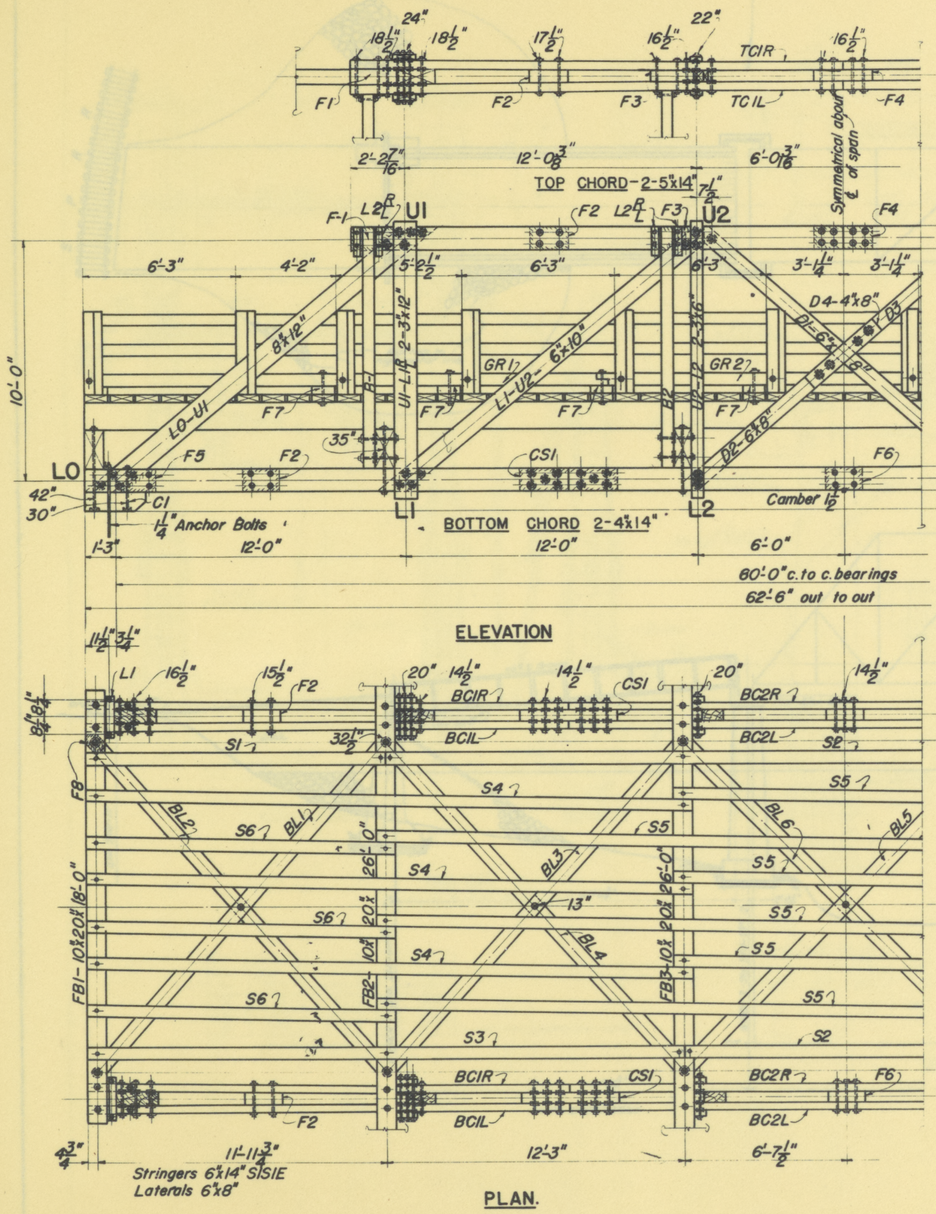
TIMBER HOWE TRUSS

80FT. & 90FT. SPANS
H-15 LOADING

SHEET TWO OF TWO SHEETS 16-C-8 17-C-8

Revised By: J.A.T. July 19,1935. DESIGNED BY W.D.S. JULY 1933

I-P-8



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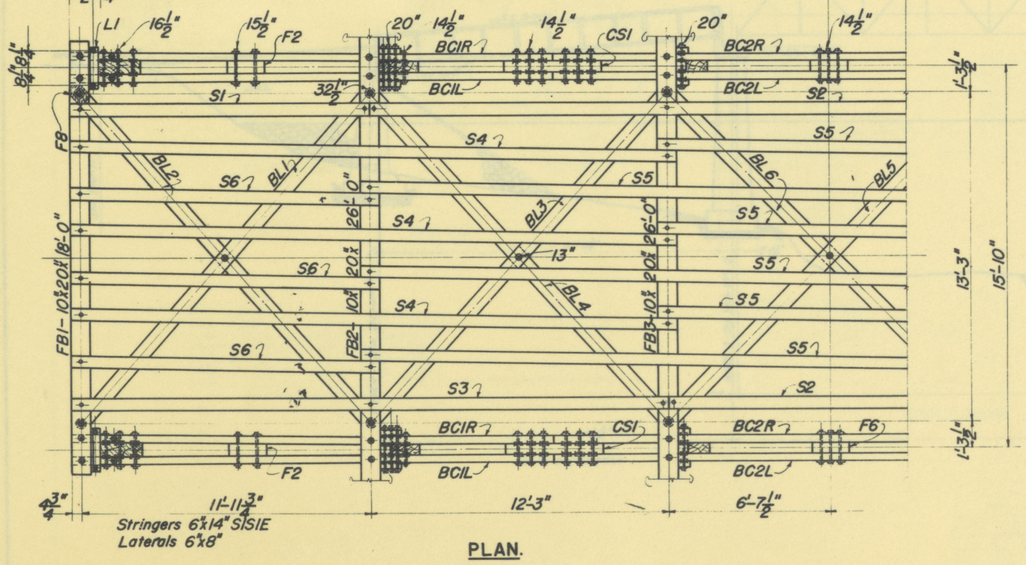
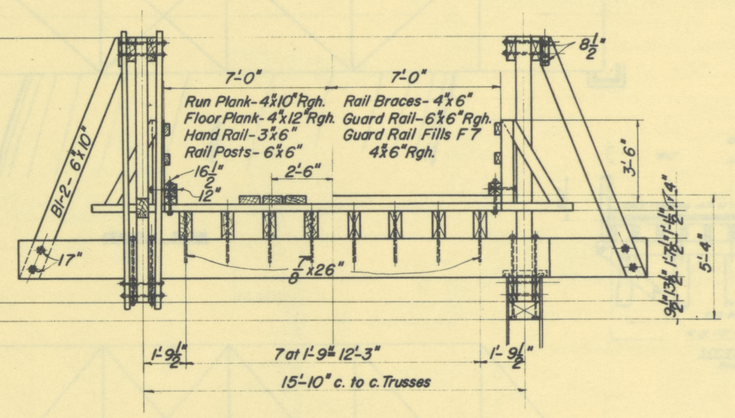
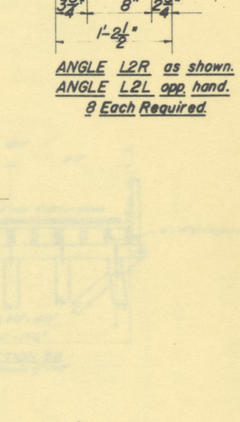


PLAN.



SECTION



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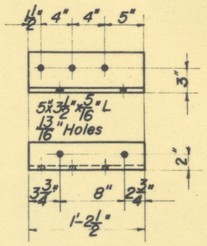
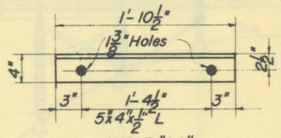


ANGLE L2R as shown.
ANGLE L2L opp. hand.
8 Each Required.



ANGLE "L1"
4 Required.

GENERAL NOTES.

Roadway plank to be spiked to each stringer with two 7" wire spikes. Run plank to have butts staggered and to be spiked at each end with two 7" wire spikes and one spike at approx. 2'-0" ctrs. on alternate sides.

Rail posts to be bolted as shown and toe nailed at bottom with 60d nails. Rail post braces to be spiked with 7" wire spikes. Rails to be nailed to posts with 60d nails. Butts to be staggered on posts.

All timber to be S4S unless otherwise noted. All timber except rails, rail posts, rail braces, and run plank to be pressure treated with creosote. All treated timber to be fabricated before treatment.

Machine bolts to be ¾" dia. and lengths shown on plans. Drift bolts to be ⅞" dia. Washers to be standard malleable cast iron. All iron to be galvanized.

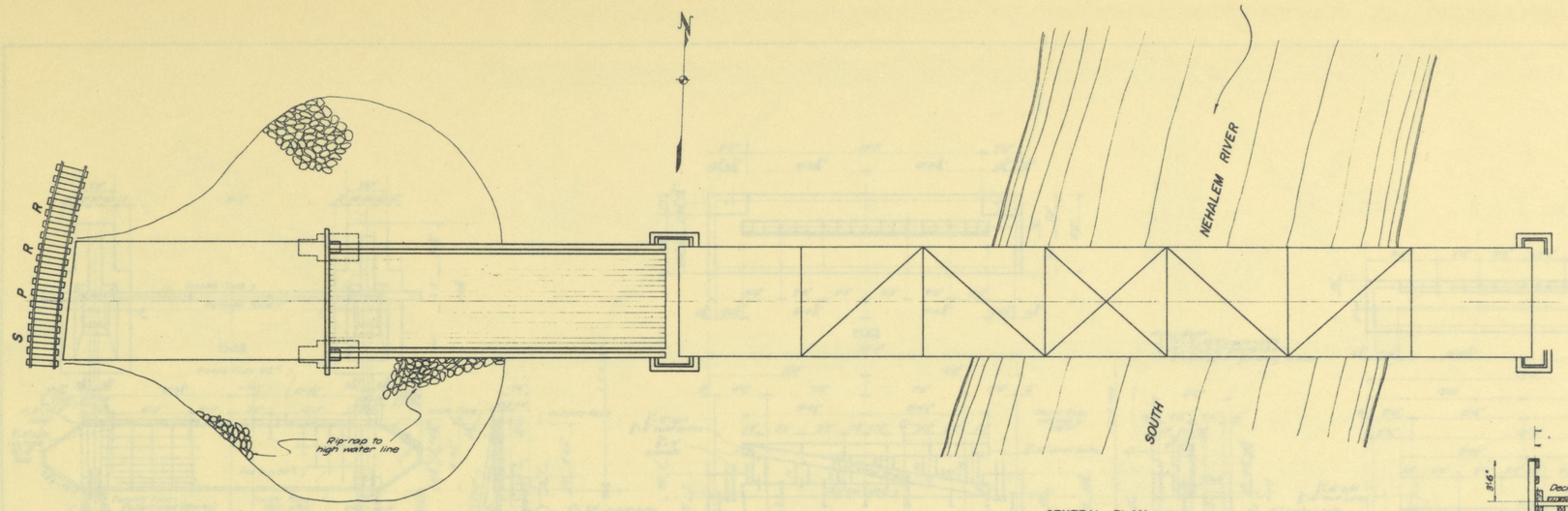
All lumber to be structural grade, Coast Douglas Fir, cut ouside the heart.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

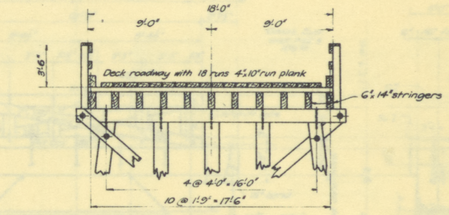
STANDARD 60 FT. HOWE TRUSS RING CONNECTED H-15 LOADING.

DATE: JULY-1935 SCALE: ⅜"=1'-0"

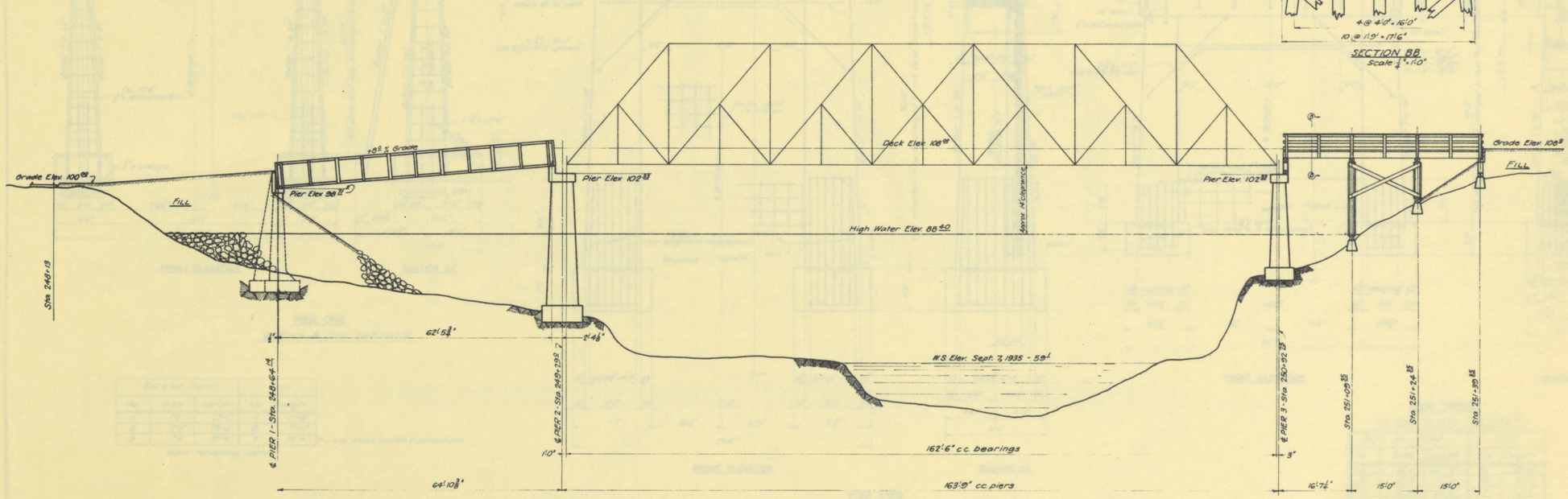
DESIGNED BY W.D.S.	APPROVED:
DRAWN BY W.D.S.	
TRACED BY W.D.S.	
CHECKED BY	REGIONAL ENGINEER.



GENERAL PLAN



SECTION BB
Scale 1/4" = 1'-0"



GENERAL ELEVATION

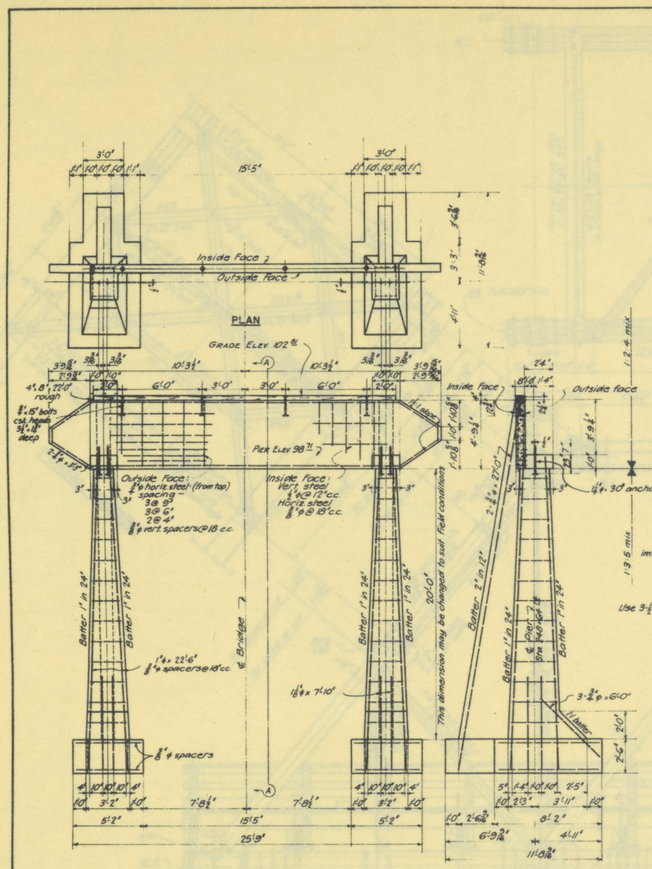
H-15 LOADING
18 FT. ROADWAY

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE-REGION 6
STATE OF OREGON CO-OPERATION

GENERAL PLAN AND ELEVATION SOUTH NEHALEM RIVER BRIDGE

DATE: NOV. 18, 1935	SCALE: 1" = 10'-0"
DESIGNED BY: W.D.S. & W.G.	APPROVED
DRAWN BY: W.G.	
TRACED BY: W.G.	REGIONAL ENGINEER
CHECKED BY: [illegible]	

SHEET 1 OF 7 SHEETS 1-P-3



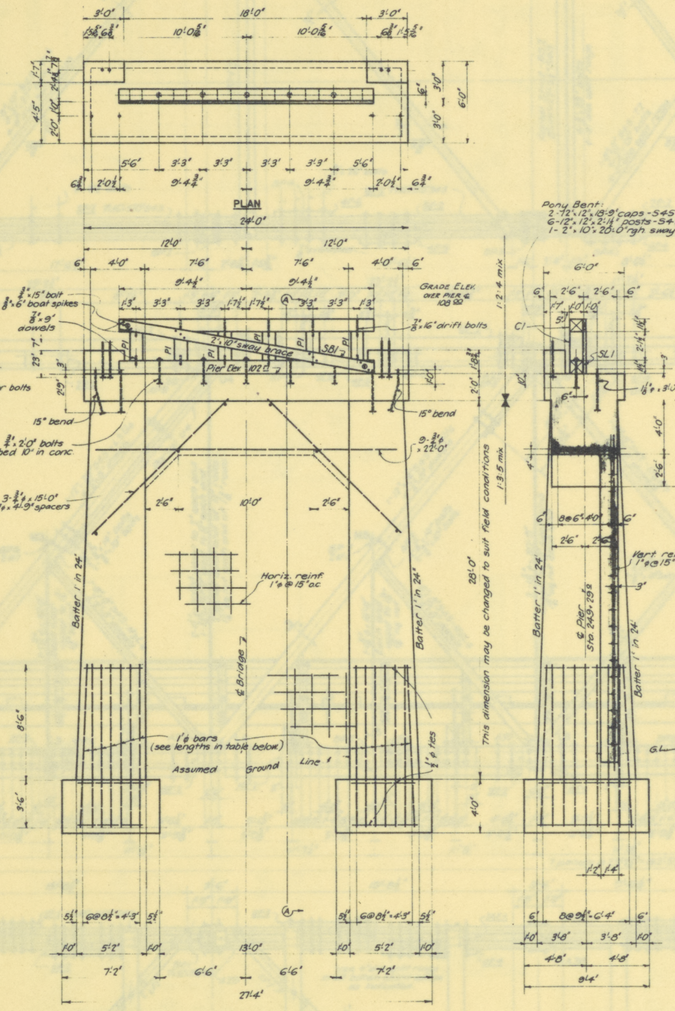
PIER ONE

℄ PIER @ STA. 248+64.14

Bars on hand			Cut	
No.	Size	Length	No.	Length
4	1" ø	22'-6"	4	22'-6"
6	1 1/8" ø	23'-6"	18	7'-10"
8	1" ø	18'-6"	8	18'-6"

order remaining bars

use where possible in parapet wall

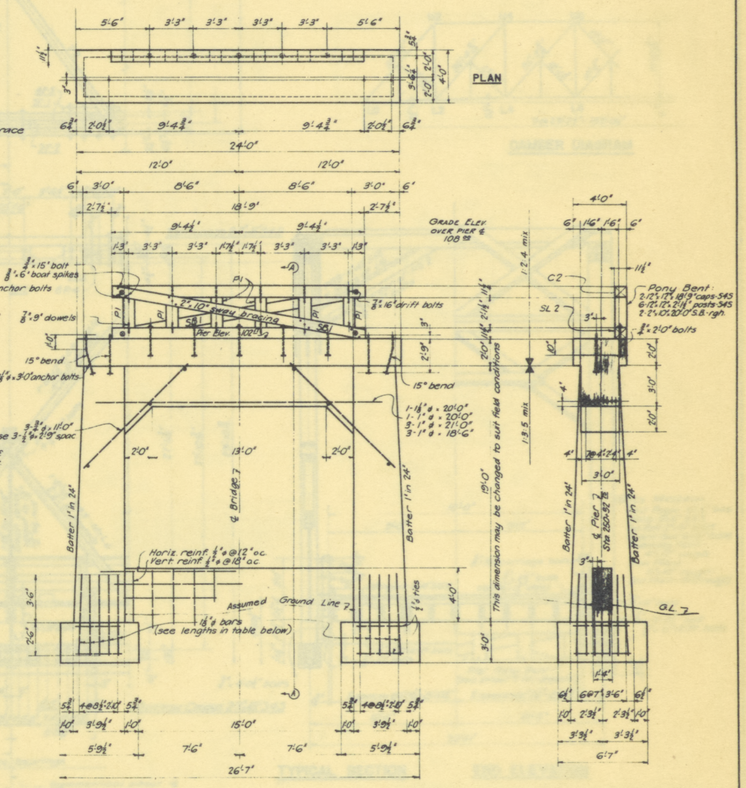


PIER TWO

℄ PIER @ STA. 249+29.2

Bars on hand			Cut	
No.	Size	Length	No.	Length
6	1" ø	25'-0"	12	12'-6"
6	1" ø	23'-0"	12	11'-6"
2	1" ø	25'-10"	4	12'-11"
1	1" ø	12'-0"	1	12'-0"

order remaining bars



PIER THREE

℄ PIER @ STA. 250+92.75

Bars on hand			Cut	
No.	Size	Length	No.	Length
6	1 1/8" ø	18'-0"	18	6'-0"
5	1 1/8" ø	17'-0"	10	5'-8"
2	1 1/8" ø	25'-0"	8	6'-3"
1	1 1/8" ø	20'-0"	1	20'-0"
1	1" ø	20'-0"	1	20'-0"
1	1" ø	21'-0"	1	21'-0"
3	1" ø	18'-6"	3	18'-6"

order remaining bars

NOTE: Chamfer all exposed corners of concrete 1".

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE - REGION 6
STATE OF OREGON CO-OPERATION

PIER DETAILS
SOUTH NEHALEM RIVER BRIDGE

DATE: NOV. 13, 1935 SCALE 1/4" = 1'-0"

DESIGNED BY: W.G.
DRAWN BY: W.G.
TRACED BY: W.G.
CHECKED BY: W.G.

APPROVED
ACTING REGIONAL ENGINEER

SHEET 2 OF 7 SHEETS

I-P-3

PLAN OF TOP CHORD SPLICES

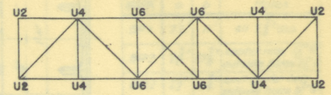
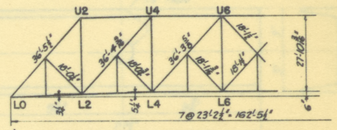


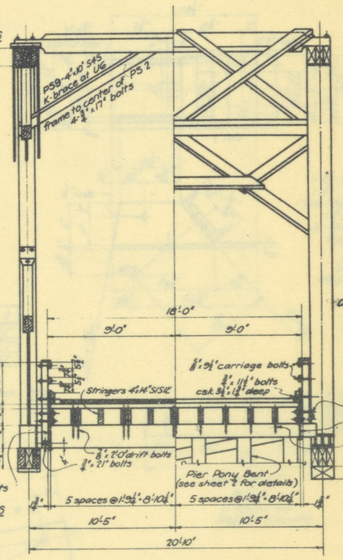
DIAGRAM OF TOP LATERALS

PLAN OF TOP LATERALS



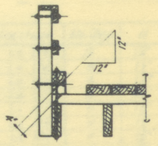
CAMBER DIAGRAM

PORTAL BRACING



TYPICAL SECTION END ELEVATION

PLAN OF BOTTOM LATERALS



SCUPPER DETAIL
Scale: 1½"=1'-0"
Make 1'-0" long. Place two per panel approximately as shown.

NOTE
For details of rods, angle blocks, and steel plates see sheet no. 4

H-15 LOADING
18 FT. ROADWAY

PLAN OF BOTTOM CHORD SPLICES

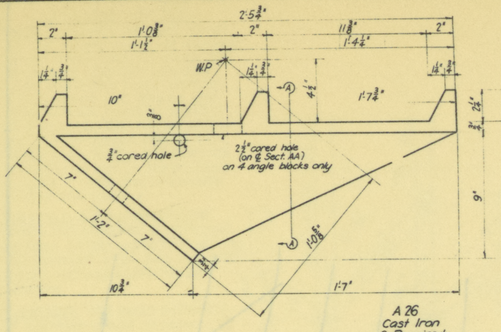
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE-REGION 6
STATE OF OREGON CO-OPERATION

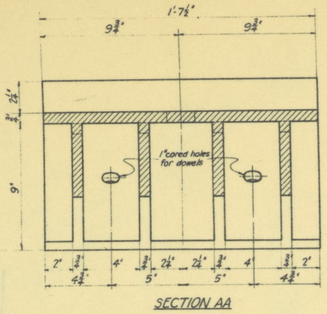
TRUSS DETAILS
SOUTH NEHALEM RIVER BRIDGE

DATE: OCTOBER 30, 1935 SCALE: 1/4"=1'-0"

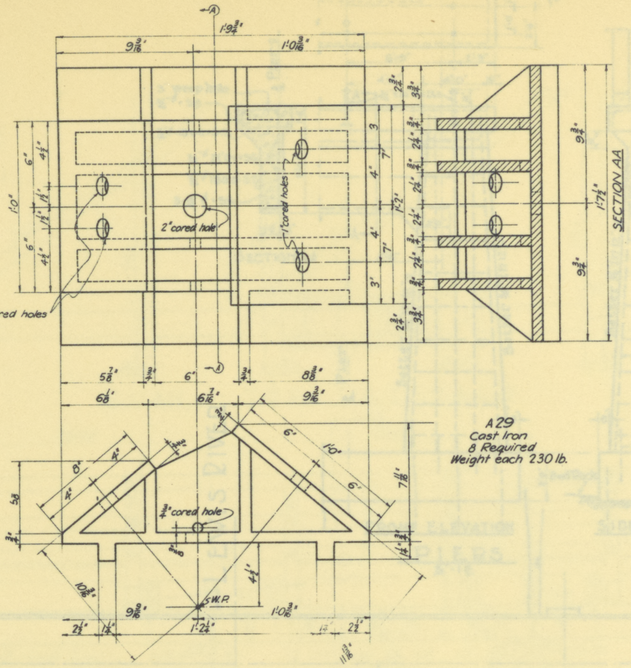
DESIGNED BY: W.G.	APPROVED
DRAWN BY: W.G.	
TRACED BY: W.G.	REGIONAL ENGINEER
CHECKED BY: W.D.S.	

SHEET 3 OF 7 SHEETS I-P-3





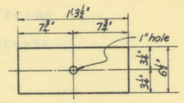
A 26
Cast Iron
8 Required
4 with - 4 without 2" cored hole
Weight each 330 lb.



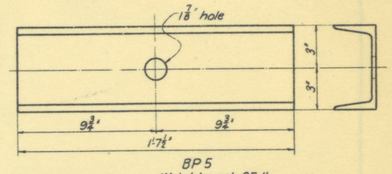
A 29
Cast Iron
8 Required
Weight each 230 lb.

MARK	a	b	Holes
BP1	2¼"	11"	All 2⅞" dia.
BP2	2⅞"	10⅞"	center hole ⅛" ℄ outside holes 2½" ℄
BP3	2½"	10¾"	omit center hole outside holes ⅛" ℄

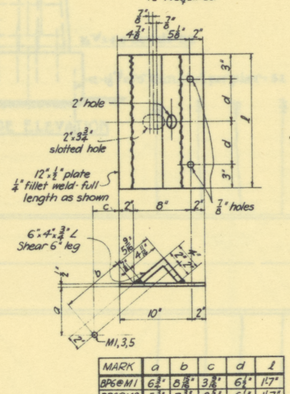
4 ℄ - 3½" × 3½" × ½" × 2'-2½"
1 ℄ - ½" × 16" × 2'-6½"
1 ℄ - ⅜" × 7" × 2'-6½"
¼" Fillet weld - Full length as shown
BP 1, 2, & 3
Weight of each bearing plate 198 lb.
Make 8 each



1 ℄ - ½" × 6½" × 15½"
BP 4
Weight each 14 lb.
12 Required

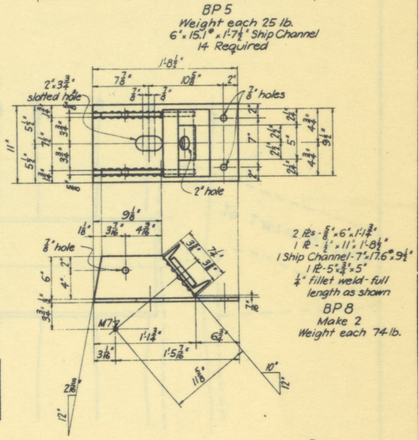


BP 5
Weight each 25 lb.
6" × 15.1# × 1'-7½" Ship Channel
14 Required

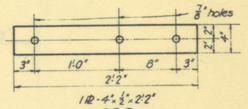


MARK	a	b	c	d	ℓ
BP6@M1	6½"	8⅜"	3½"	6½"	11'-7"
BP6@M3	5½"	7⅛"	2⅝"	6½"	11'-7"
BP7@M5	5½"	7⅛"	2⅝"	3½"	11'-1"

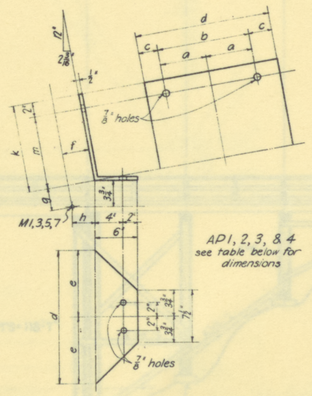
BP6 & BP7
Make 8 BP6 - Weight each 70 lb.
Make 4 BP7 - " " 48 lb.



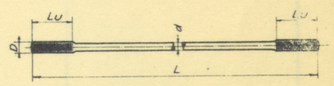
2 ℄ - ⅝" × 6" × 1'-1½"
1 ℄ - ½" × 11" × 1'-8½"
1 Ship Channel - 7" × 17.6# × 9½"
1 ℄ - 6" × ½" × 5"
¼" fillet weld - full length as shown
BP 8
Make 2
Weight each 74 lb.



1 ℄ - 4" × ½" × 2'-2"
BP 9
8 Required
Weight each 14 lb.

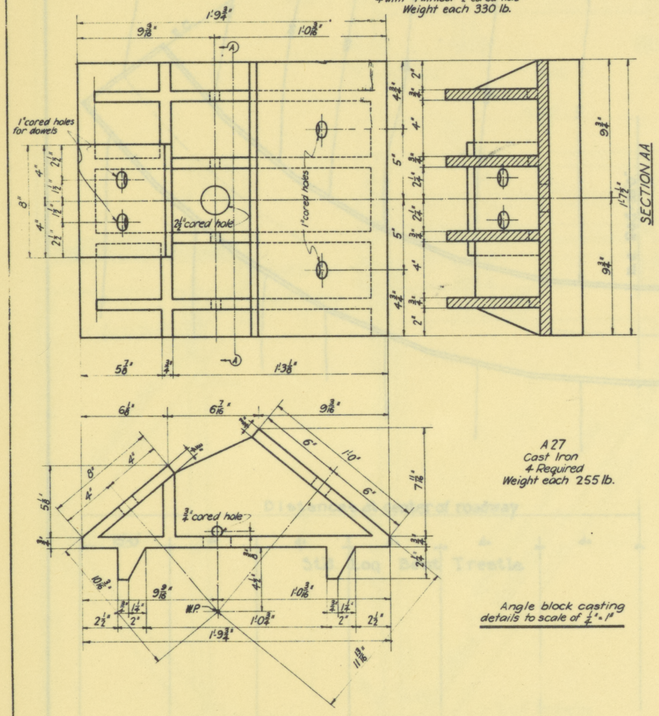


AP1, 2, 3, & 4
see table below for dimensions



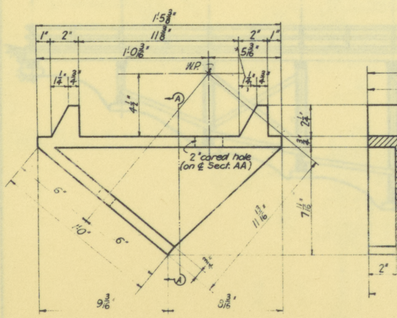
LOCATION	No. Req.	d	D	LU	L
L2 U2	12	1¼"	2¼"	5"	30'-9"
L4 U4	8	1⅛"	2"	4½"	30'-9"
L4 U4	4	1⅛"	2"	4"	30'-9"
L6 U6	8	1⅛"	1¼"	2"	30'-9"
L1 M1	4	1⅛"	1¼"	4"	16'-9"
L3 M3	4	1⅛"	1¼"	4"	16'-8"
L5 M5	4	1⅛"	1¼"	4"	16'-8"
L7 M7	2	1⅛"	1¼"	4"	16'-8"

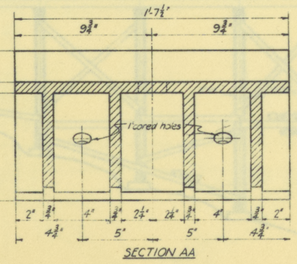
TABLE OF TRUSS & HANGER RODS
Furnish 2 sq. nuts with each rod



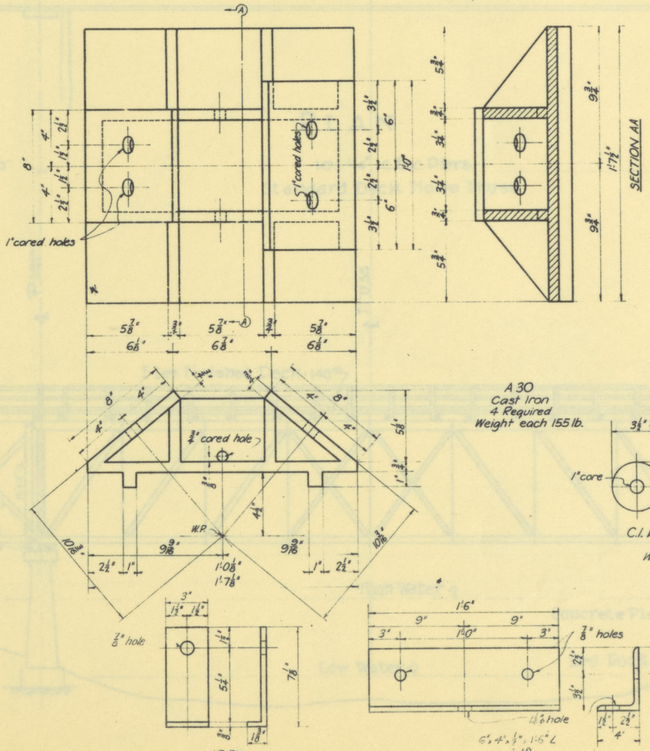
A 27
Cast Iron
4 Required
Weight each 255 lb.

Angle block casting details to scale of ½" = 1"

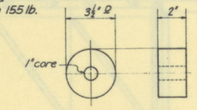


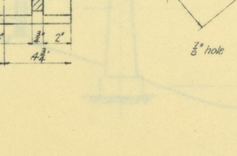


A 28
Cast Iron
4 Required
*Weight each 200 lb.



A 30
Cast Iron
4 Required
Weight each 155 lb.





AP5
Make 32 from ¾" plate
Weight each 2¼ lb.

6" × 4" × ½" × 1'-6"
A 18
5 Required
Weight each 24 lb.

MARK	WEIGHT	No. Req.	a	b	c	d	e	f	g	h	k	m
AP1	46 lb.	4	6½"	1'-1"	3"	1'-7"	9½"	6⅜"	2½"	6⅜"	1'-1"	11"
AP2	42	4	6½"	1'-1"	3"	1'-7"	9½"	5⅜"	2⅜"	5⅜"	11⅜"	9⅜"
AP3	30	4	3½"	7"	3"	1'-1"	6½"	5⅜"	2⅜"	5⅜"	11⅜"	9⅜"
AP4	30	2	3½"	7"	2"	11"	5½"	3⅜"	3⅛"	3⅛"	1'-2⅜"	1'-0⅜"

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE - REGION 6
STATE OF OREGON CO-OPERATION

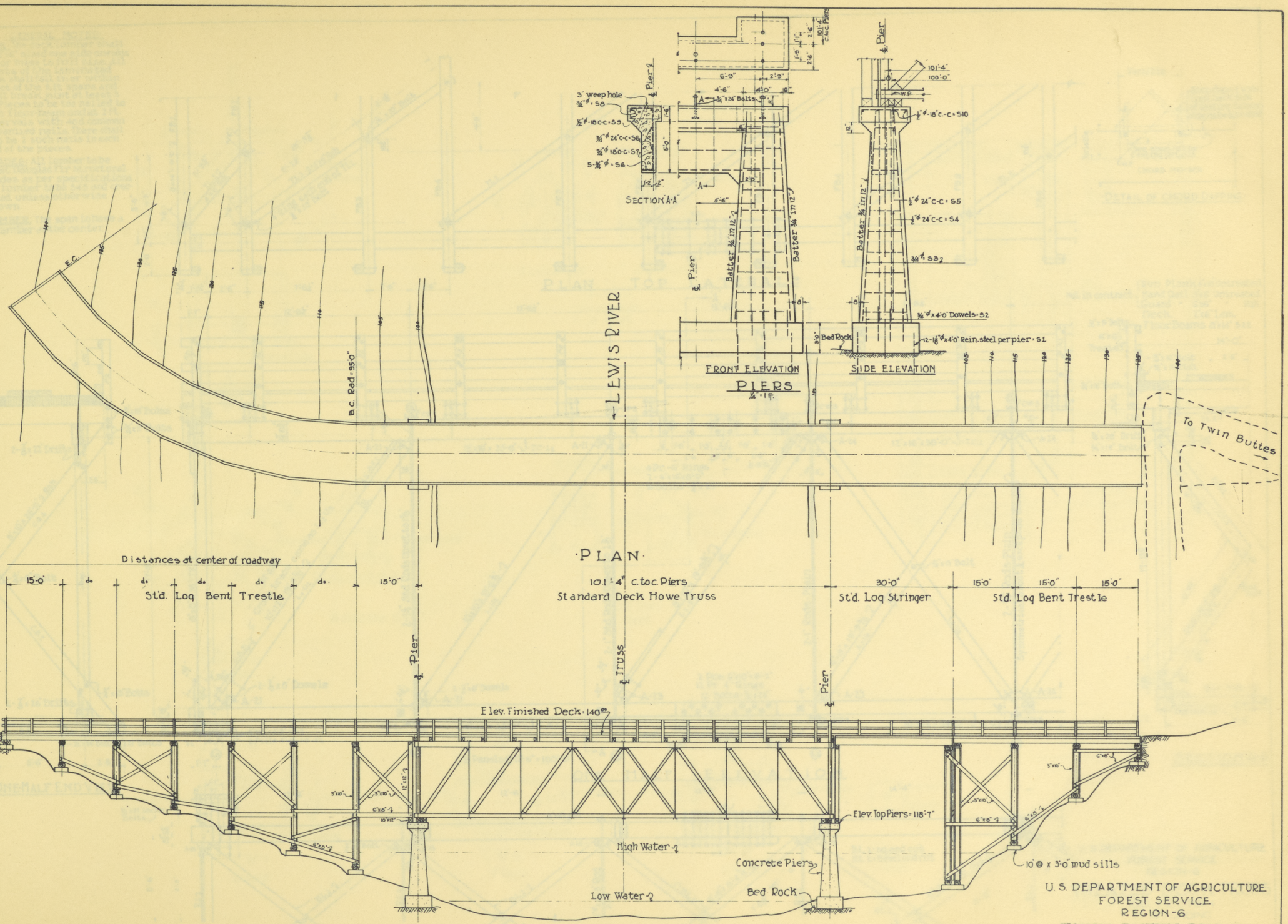
IRON DETAILS
SOUTH NEHALEM RIVER BRIDGE

DATE: JANUARY 8, 1936 SCALE: AS NOTED

DESIGNED BY W.G.
DRAWN BY W.G.
TRACED BY W.G.
CHECKED BY R.W.S.

APPROVED
REGIONAL ENGINEER

SHEET 4 OF 7 SHEETS I-P-3



PLAN

ELEVATION

Scale 1 in.=10 ft.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

TWIN BUTTES BRIDGE
LEWIS RIVER

Designed by R.W.L. July 1934.

5-M-15

GENERAL NOTES

DECK: The deck lumber shall be 2"x6" sized one side one edge hit or miss to full size. All joints of the laminated deck shall fall in or within a foot of the 5 ft spans and shall break joint at least 3 ft. Pieces to be toe nailed to each floor-beam and at 2 Ft. intervals with 40d common galvanized nails. There shall also be 2 such nails in each end of the pieces.

GRADES: All lumber to be Coast Douglas Fir Structural grades as per specifications. All lumber to be S4S and creosoted unless otherwise shown.

CAMBER: The span to have a 3" camber at the center.

PLAN TOP LATERALS

·DETAIL OF CHORD DAPPING·

ONE-HALF END VIEW

ONE HALF ELEVATION

SECTION A-A

ONE HALF BOTTOM LATERALS

Not in contract
Run Plank 4"x10" Untreated.
Hand Rail 3"x6" Untreated.
Guard " 6"x6" " Rgh.
Deck 2"x6" Lam.
Floor Beams 8"x14" 92E

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

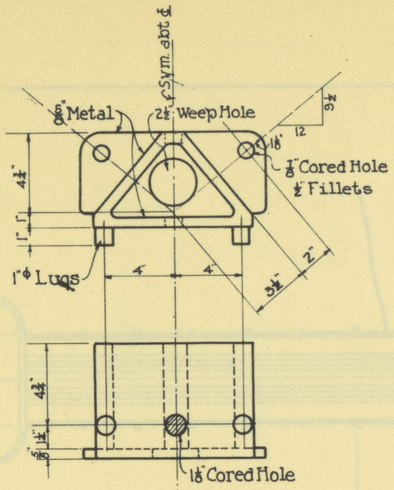
TREATED DECK TRUSS
100 FT. SPAN
H-15 LOADING

SHEET ONE OF TWO SHEETS

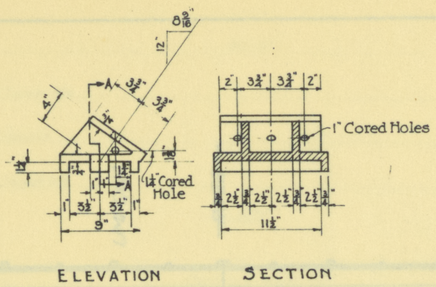
Scale 3/8" = 1 FT

DESIGNED BY R.W.L. JULY 1934.

5-14-20



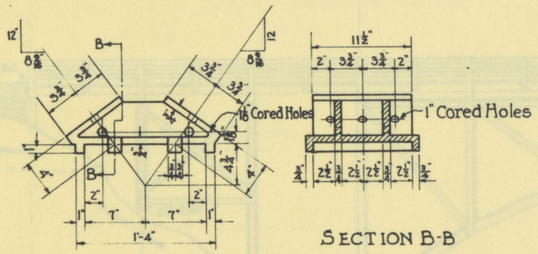
A-25
Cast Iron
18 Req'd.



ELEVATION SECTION

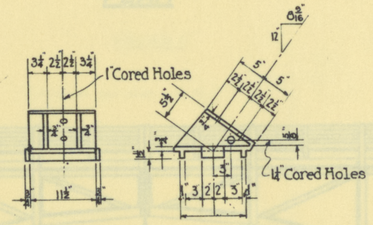
A-23
Cast Iron
8 Req'd

NO	MATERIAL	SIZE	LENGTH	LOCATION	LBS.
8	Steel Rods Sid Upset	1¼ ϕ	19'6"	L_1-U_1	667
8	" " " "	1" ϕ	"	L_2-U_2	427
8	" " Plain	1" ϕ	19'5"	L_3-U_3	408
4	" " "	¾ ϕ	"	L_4-U_4	117
9	" " "	1" ϕ	12'6"	R1	300
16	Cast iron A-21			See Detail	1250
8	" " A-23			" "	528
8	" " A-24			" "	800
18	" " A-25			" "	560
8	Steel CW1			" "	
8	" CW2			" "	
12	" CW3			" "	
18	" Plates	5"x½"	0'-5"	PR1	64
6	Machine Bolts	¾"	8"		8
32	" "	"	9"		49
16	" "	"	11"		30
16	" "	"	12"		30
20	" "	"	13"		37
52	" "	"	14"		113
108	" "	"	16"		261
28	" "	"	20"		81
16	" "	"	24"	8 with 4"x½"x0'4" Wash. one end	76
112	" "	"	25"		396
8	" "	"	27"		30
176	Carriage Bolts	⅜"	10"	Hand Rail	58
56	Steel Dowels	⅞ ϕ	8"		113
8	Drift Bolts	"	22		30
8	" "	"	26		36
36	" "	"	28		172
116	Split Rings	4" Dia			
32	" "	6" "			
6000	40d. Com. Galv. Spikes.			Decking.	350
500	Wire spikes	5/16" ϕ	7"	Galv. Run Plank.	70
820	Mall. Washers	¾"			270
176	Cut. Wrt. Washers	⅜"			10
176	" " "	½"			12

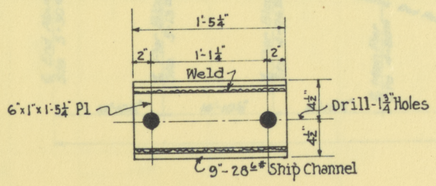


SECTION B-B

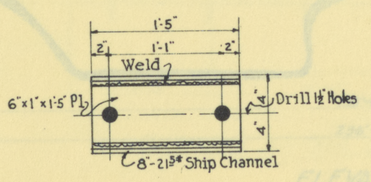
A-24
Cast Iron
8 Req'd



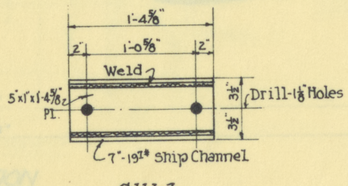
A-21
Cast Iron
16 Req'd.



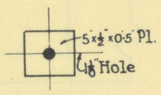
CW1
8- Req'd.



CW2
8 Req'd.



CW3
12 Req'd.



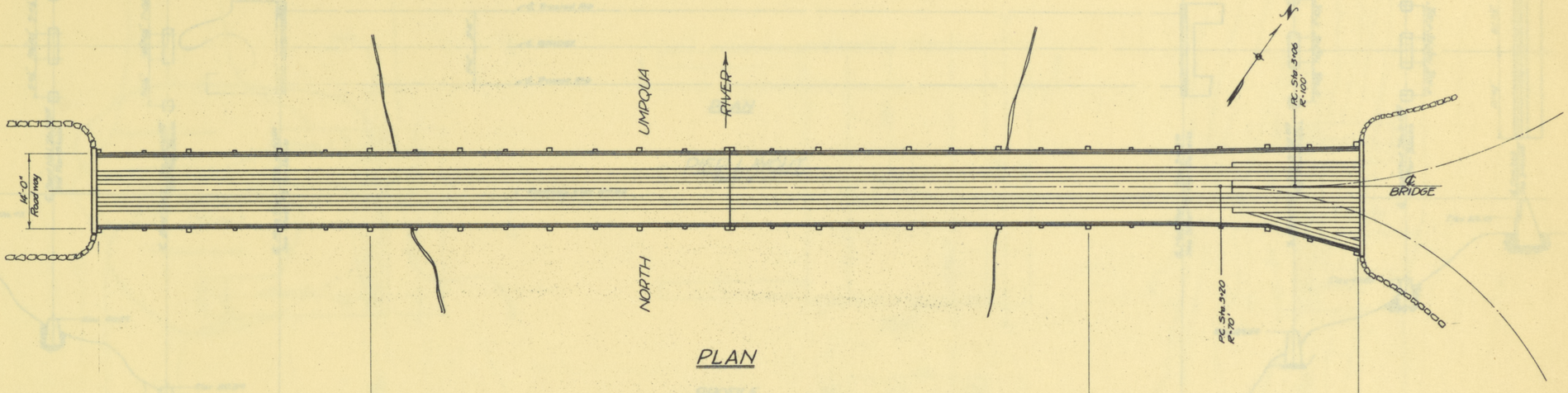
PR1
18 Req'd.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

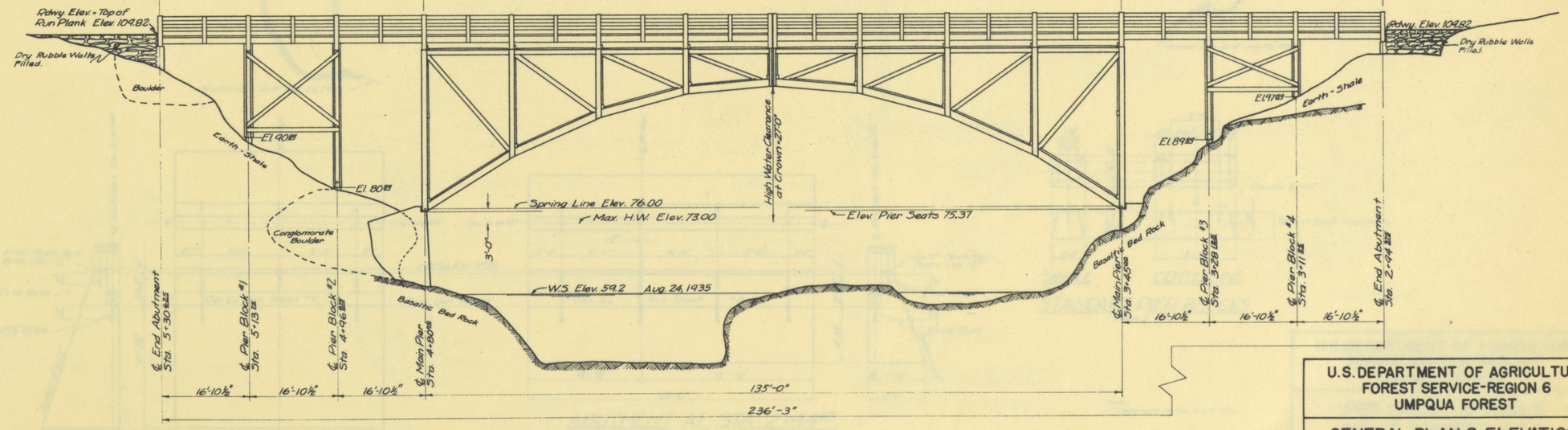
TREATED DECK TRUSS

100 FT. SPAN
Scale: None
SHEET TWO OF TWO SHEETS

DESIGNED BY R.W.L. JULY '34
5-14-20



PLAN



ELEVATION

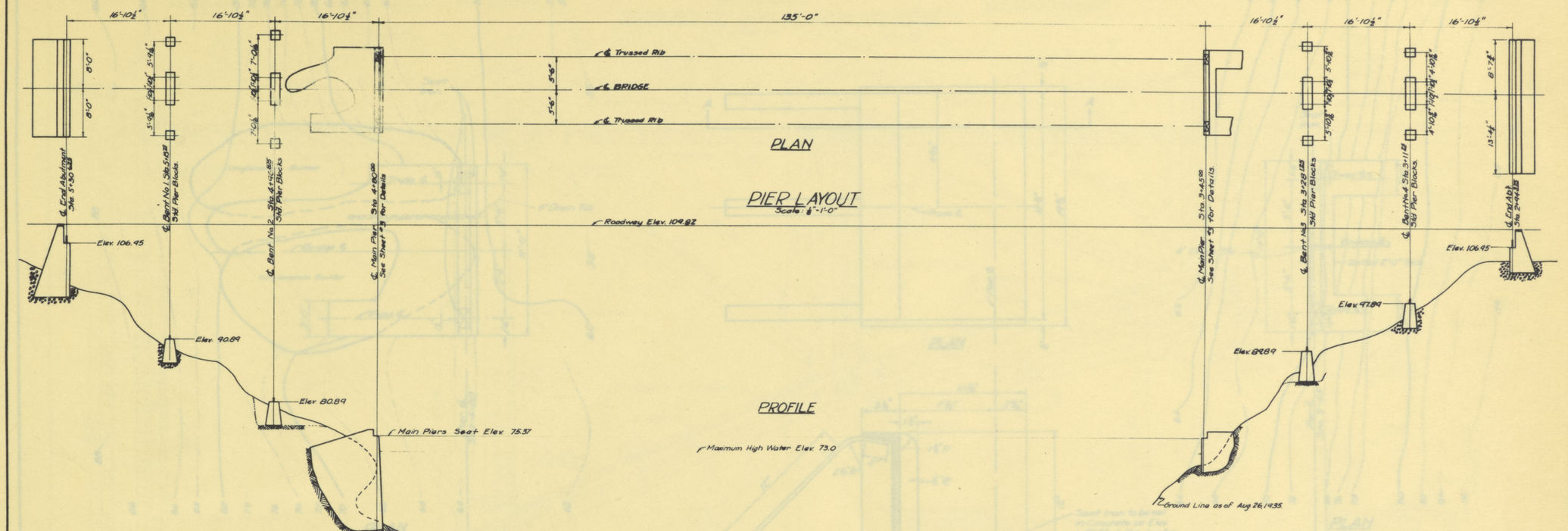
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE-REGION 6
UMPQUA FOREST

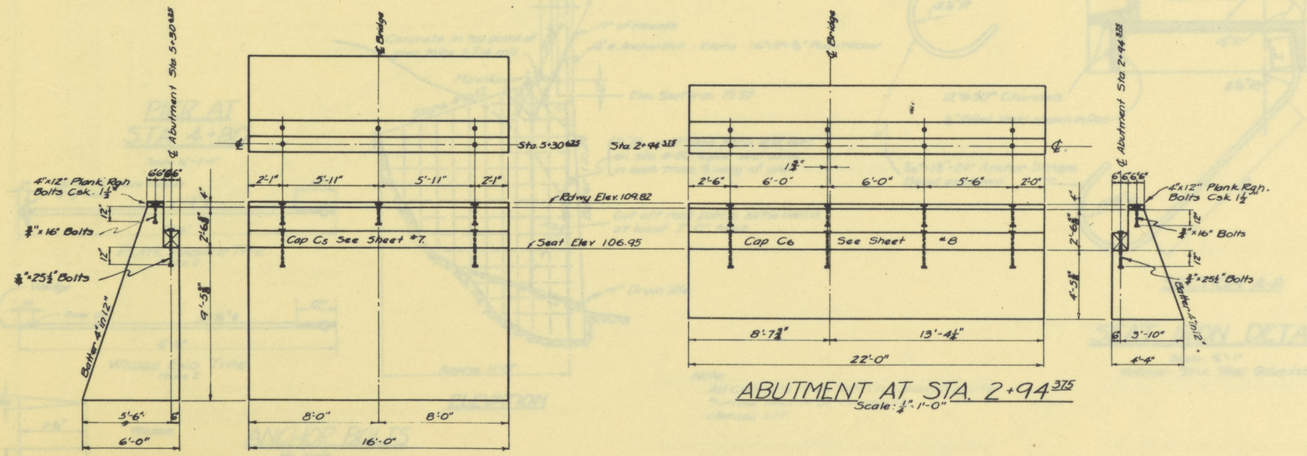
GENERAL PLAN & ELEVATION 135'-0" 3-HINGED ARCH NORTH UMPQUA RIVER BRIDGE

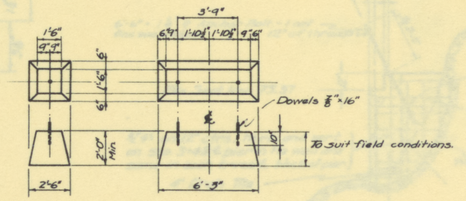
SEPT. 18, 1935 SCALE: 1"=10'-0"

DESIGNED BY: J.A.T.	APPROVED
DRAWN BY: J.A.T.	
TRACED BY: J.A.T.	REGIONAL ENGINEER
CHECKED BY: W.D.S.	

SHEET 1 OF 8 SHEETS 1-P-14







Note:
Concrete to be 1:3:5 Mix.

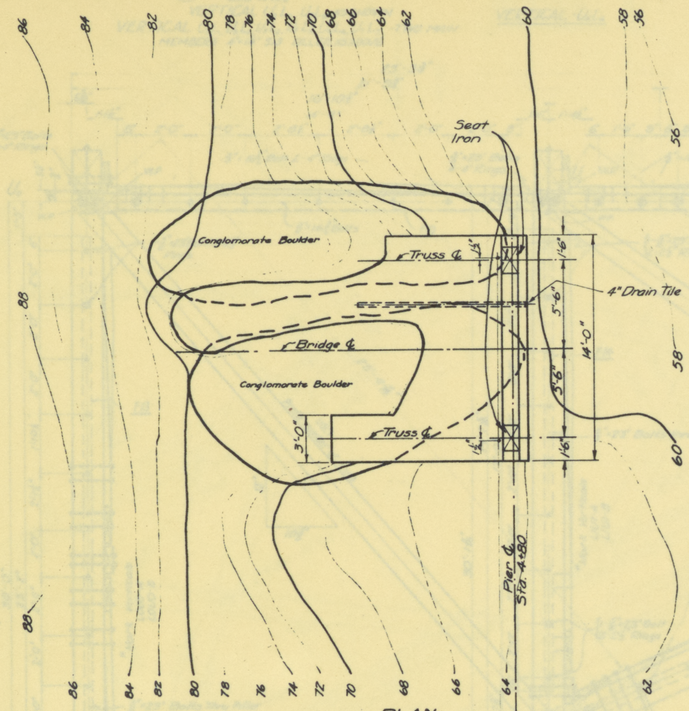
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE-REGION 6
UMPQUA FOREST

PIER LAYOUT & DETAILS
135'-0" 3-HINGED ARCH
NORTH UMPQUA RIVER BRIDGE

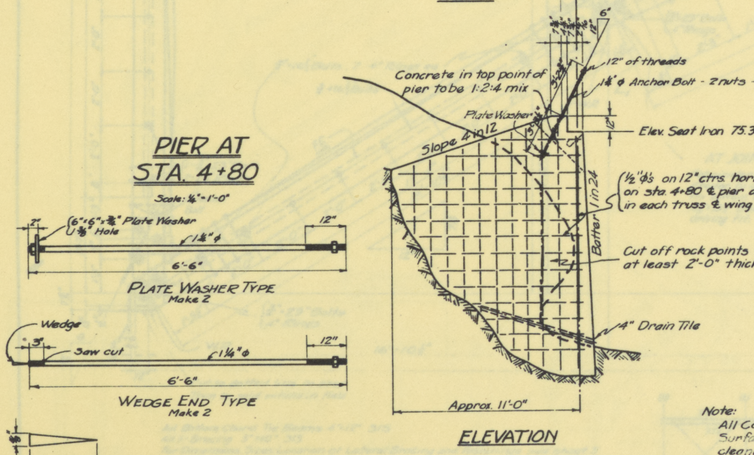
OCT. 17, 1935 — SCALE: AS NOTED

DESIGNED BY: J.A.T.	APPROVED
DRAWN BY: J.A.T.	
TRACED BY: J.A.T.	
CHECKED BY: W.D.S.	REGIONAL ENGINEER

SHEET 2 OF 8 SHEETS — I-P-14



PLAN



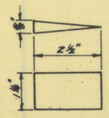
ELEVATION

PIER AT STA. 4+80

Scale: ¼" = 1'-0"

PLATE WASHER TYPE
Make 2

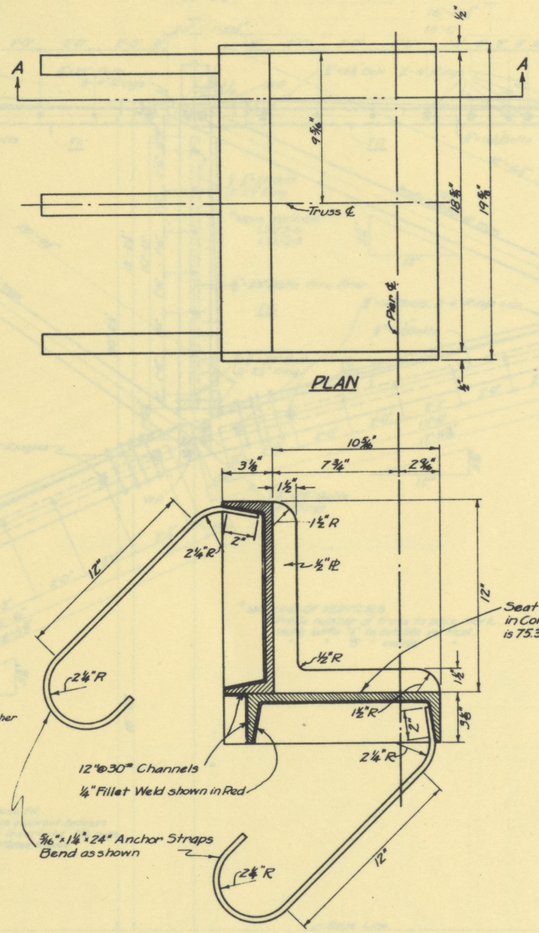
WEDGE END TYPE
Make 2



WEDGE

ANCHOR BOLTS

No Scale

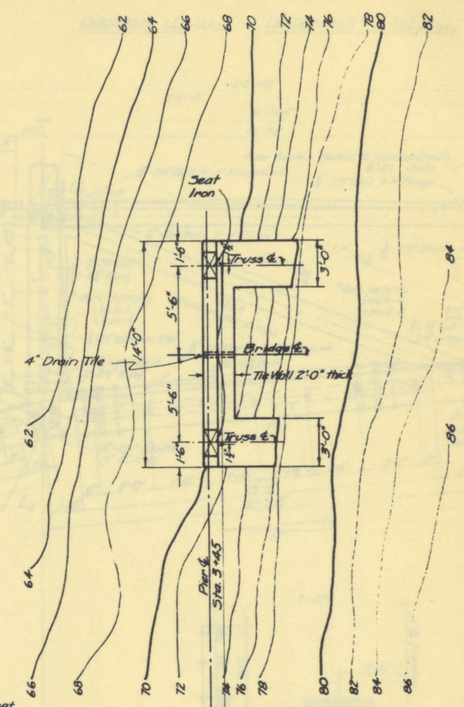


PLAN

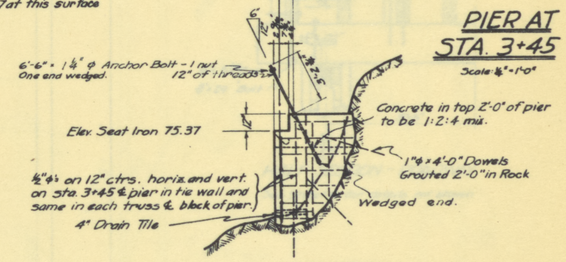
SECTION A-A

SEAT IRON DETAILS

Scale: ½" = 1"
Material - Struc. Steel - Galvanized.



PLAN



ELEVATION

PIER AT STA. 3+45

Scale: ⅛" = 1'-0"

Note:
All Concrete to be 1:3:5 mix. except as noted.
Surface rock to be thoroughly cleaned off.

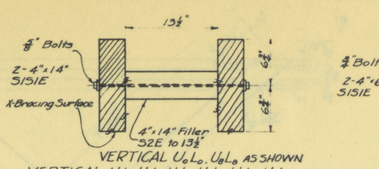
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE - REGION 6
UMPQUA FOREST

MAIN PIERS - LAYOUT & DETAIL
135'-0" 3-HINGED ARCH
NORTH UMPQUA RIVER BRIDGE

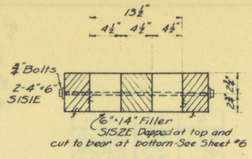
SEPT. 13, 1935 — SCALE: AS NOTED

DESIGNED BY:	J.A.T.
DRAWN BY:	J.A.T.
TRACED BY:	J.A.T.
CHECKED BY:	W.O.S.

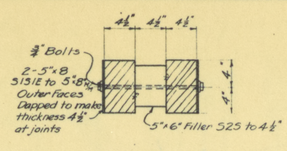
APPROVED
REGIONAL ENGINEER



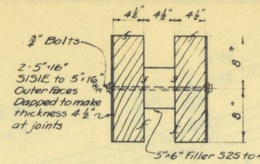
VERTICAL U_0L_0, U_6L_6 AS SHOWN
VERTICAL U_1L_1, U_2L_2, U_3L_3, U_4L_4, U_5L_5, U_6L_6, U_7L_7 -TWO MAIN MEMBERS 4"×14" SIS FILLER AS ABOVE



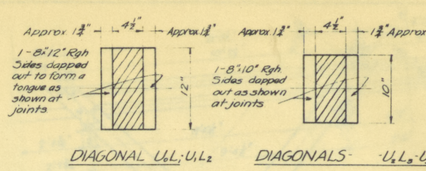
VERTICAL - U_6L_4



ALL TOP CHORD

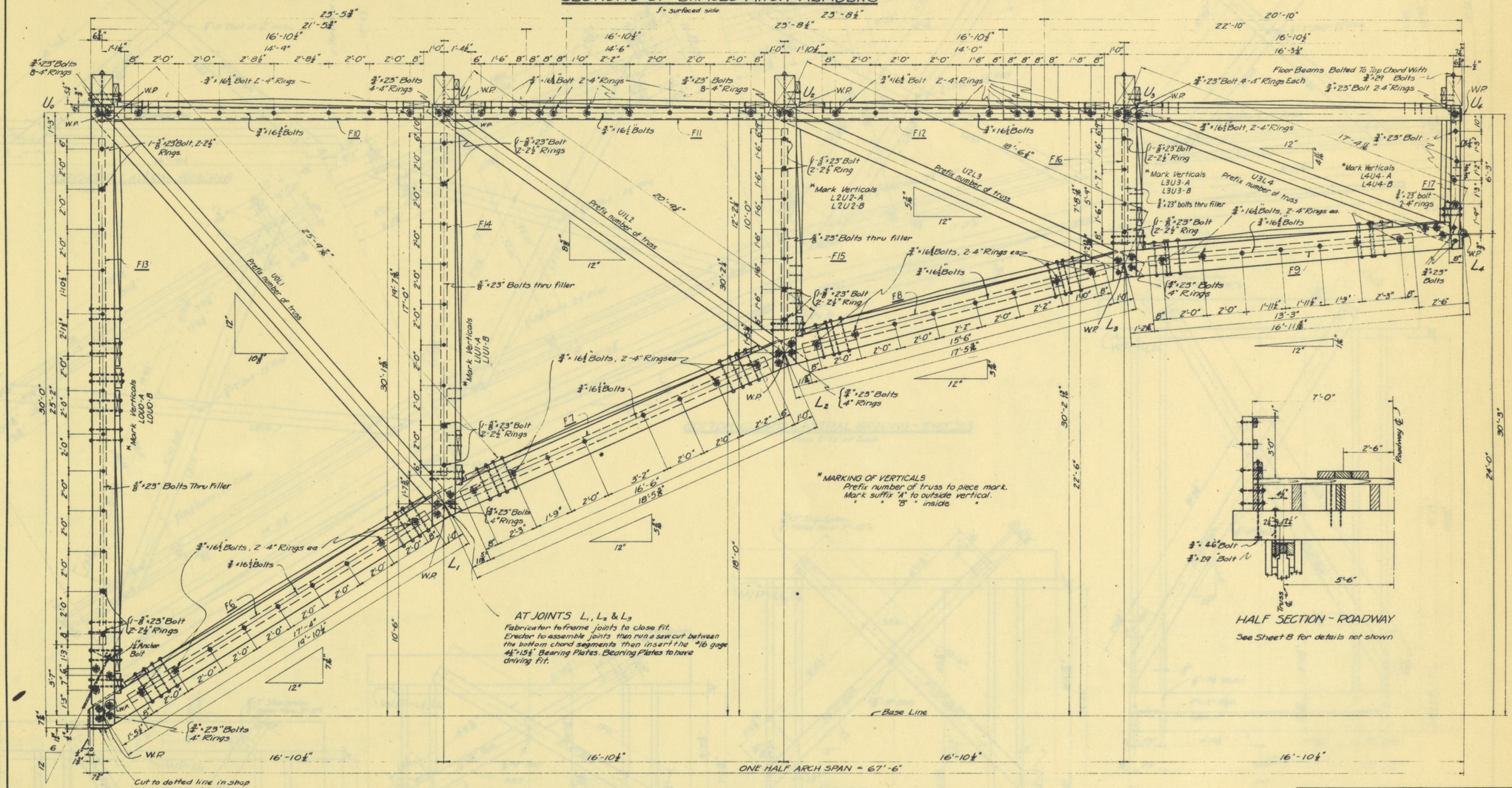


ALL BOTTOM CHORD



DIAGONAL U_0L_1; U_1L_2 DIAGONALS - U_2L_3-U_5L_4

SECTIONS OF BRACED ARCH MEMBERS

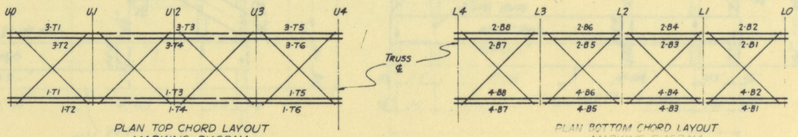


*MARKING OF VERTICALS
Prefix number of truss to piece mark.
Mark suffix "A" to outside vertical.
"B" " inside "

AT JOINTS L_1, L_2 & L_3
Fabricator to frame joints to close fit. Erector to assemble joints then run a saw cut between the bottom chord segments then insert the ⅜" gage 4½"×13½" Bearing Plates. Bearing Plates to have driving fit.

HALF SECTION - ROADWAY
See Sheet 8 for details not shown

All Bottom Chord Tie Beams 4"×12" SIS
All X-Bracing 3"×10" SIS
For Dimensions, Sizes, Location of Lateral Bracing and fastenings see sheet 5
Arch Floor Beams 12"×18" SIS2E.



PLAN TOP CHORD LAYOUT MARKING DIAGRAM

PLAN BOTTOM CHORD LAYOUT MARKING DIAGRAM

Match mark by prefix 1, 2, 3, or 4 on each truss as indicated.

NOTE
Trusses nos. 2 & 4 to be assembled together for one end of bridge.
Trusses nos. 1 & 3 likewise assembled for other end of bridge.

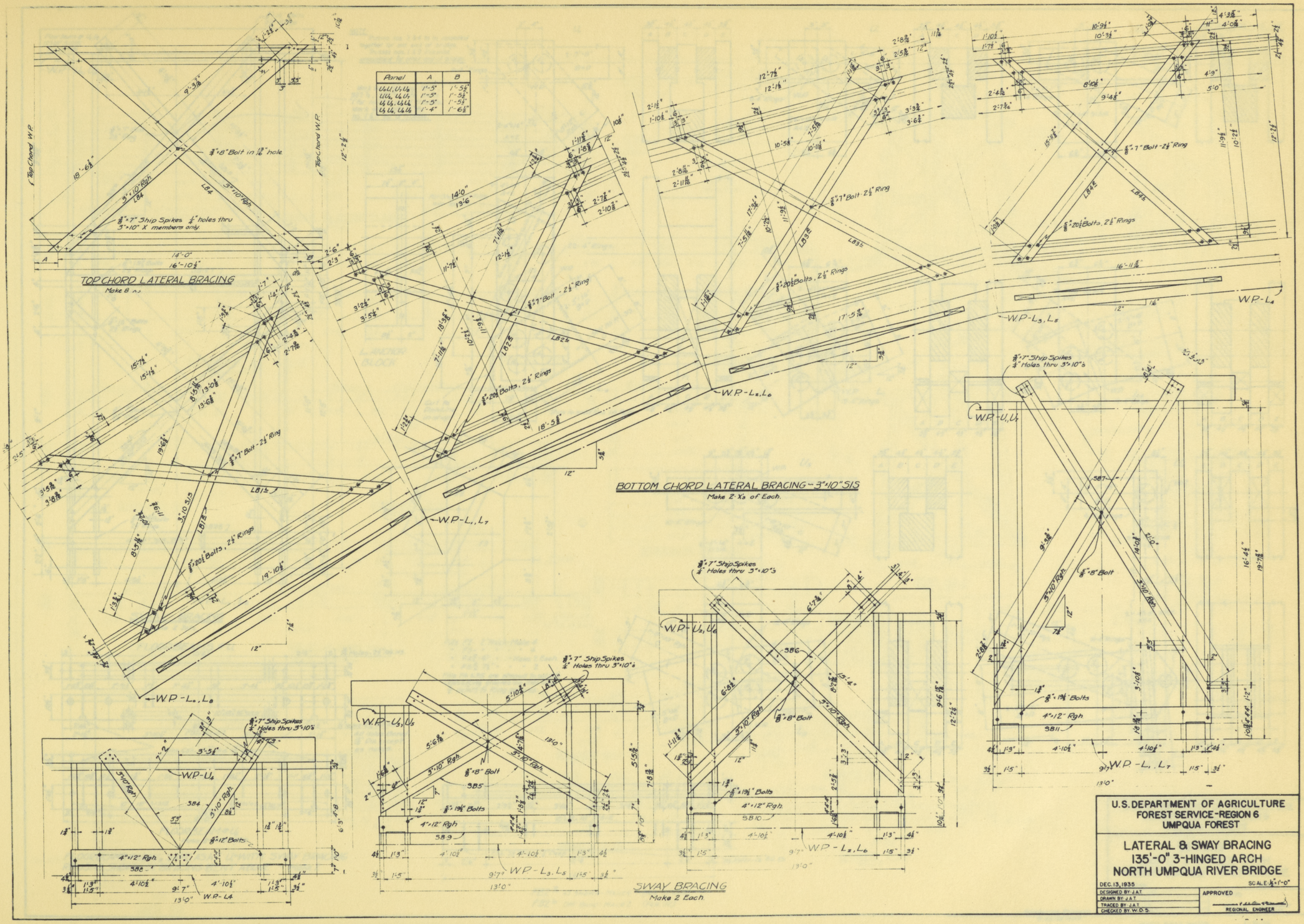
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE-REGION 6
UMPQUA FOREST

ARCH RIB MAKE-UP
135'-0" 3-HINGED ARCH
NORTH UMPQUA RIVER BRIDGE

DEC. 7, 1935 SCALE: ½"=1'-0"

DESIGNED BY: J.A.T.	APPROVED
DRAWN BY: J.A.T.	
TRACED BY: J.A.T.	REGIONAL ENGINEER
CHECKED BY: W.D.S.	

SHEET 4 OF 8 SHEETS I-P-14



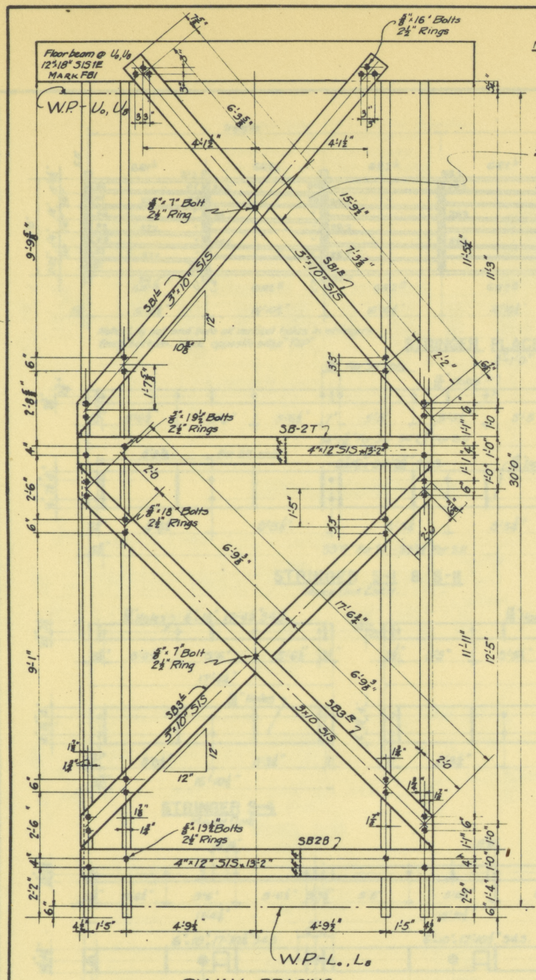
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE-REGION 6
UMPQUA FOREST

LATERAL & SWAY BRACING
135'-0" 3-HINGED ARCH
NORTH UMPQUA RIVER BRIDGE

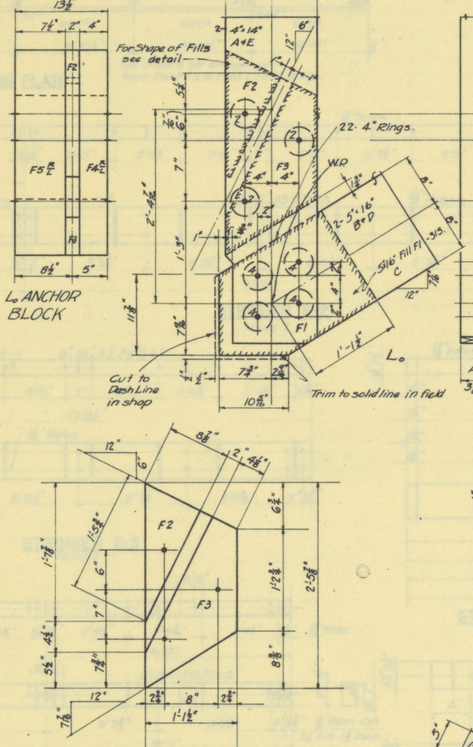
DEC. 13, 1935 — SCALE: ½"=1'-0"

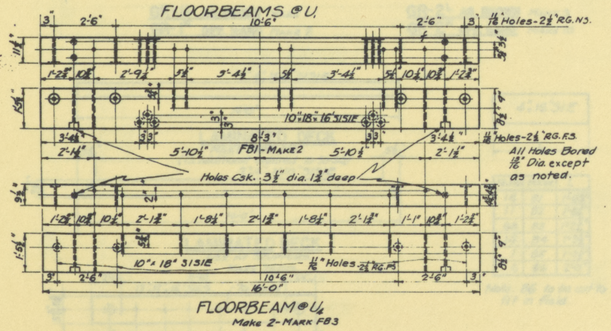
DESIGNED BY J.A.T.
DRAWN BY J.A.T.
TRACED BY J.A.T.
CHECKED BY W.D.S.

APPROVED
REGIONAL ENGINEER



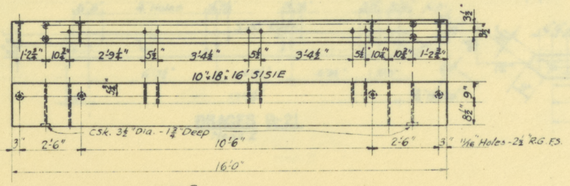
SWAY BRACING
Make 2 Sets.





FLOORBEAM @ U4
Make 2 - MARK FB3

FLOORBEAMS @ U6 & U8 SAME AS AT U1 WITH SWAY BRACING RINGS AS SHOWN IN BRACING BENT ABOVE - Make 2



FB2 R AS SHOWN - Make 4 (FOR U1 & U3)
FB2 L OPP HAND - MAKE 2 (FOR U2)

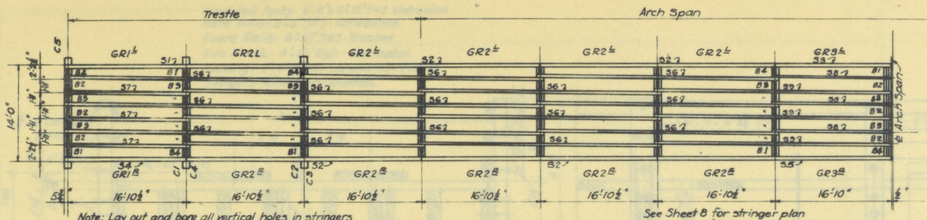
Floorbeams Revised 2-28-36 W.D.S.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE - REGION 6
UMPQUA FOREST

DETAILS
135'-0" 3-HINGED ARCH
NORTH UMPQUA RIVER BRIDGE

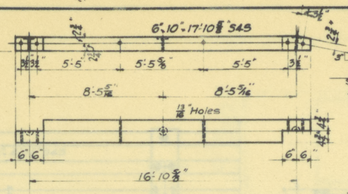
DEC. 18, 1935 — SCALE:
DESIGNED BY: J.A.T.
DRAWN BY: J.A.T.
TRACED BY: J.A.T.
CHECKED BY: W.D.S.
APPROVED
REGIONAL ENGINEER

SHEET 6 OF 8 SHEETS — 1-P-14

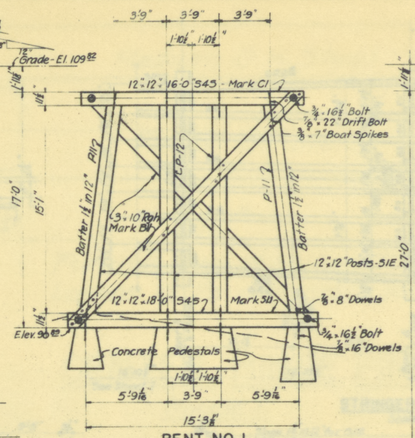


STRINGER PLACING PLAN.

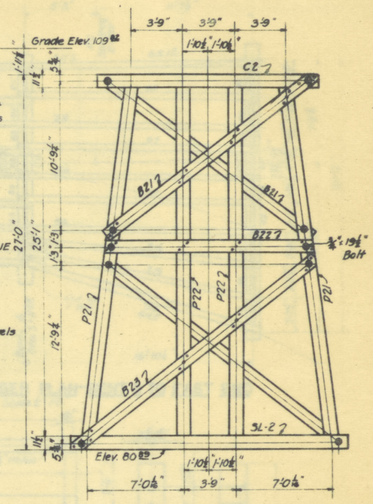
See Sheet 8 for stringer plan from Bent #3 to East End of Bridge



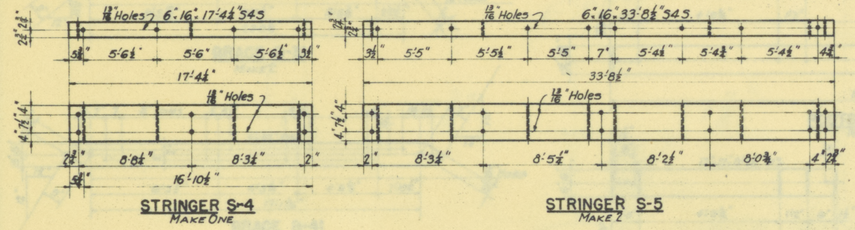
GR-4
MAKE ONE.



BENT NO. 1
Sta. 5+13.62



BENT NO. 2
Sta. 4+96.62
Details not shown same as Bent #1.



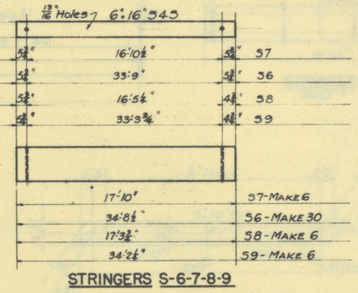
STRINGER S-1 & S-11
MAKE ONE EACH.

STRINGER S-2
MAKE 7

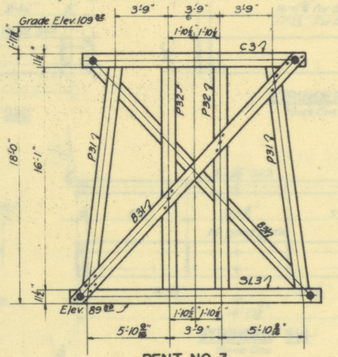
STRINGER S-3
MAKE 2

STRINGER S-4
MAKE ONE

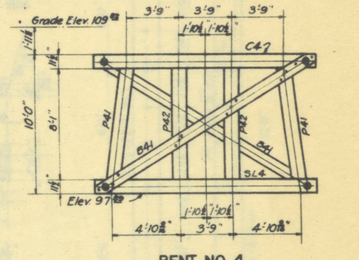
STRINGER S-5
MAKE 2



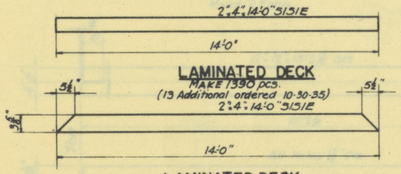
STRINGERS S-6-7-8-9



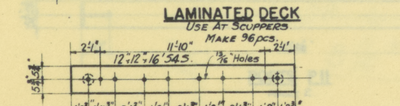
BENT NO. 3
Sta. 3+78.62
Details not shown same as Bent #1.



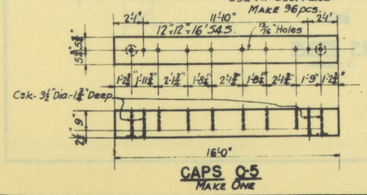
BENT NO. 4
Sta. 3+11.62
Details not shown same as Bent #1.



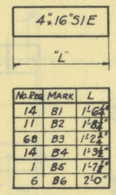
LAMINATED DECK
MAKE 1390 PCS
(13 Additional ordered 10-30-35)
2"x4"x14'0" S1S1E



LAMINATED DECK
USE AT SCUPPERS
MAKE 96 PCS.

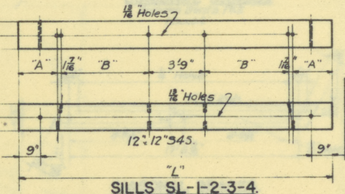


CAPS C-5
MAKE ONE



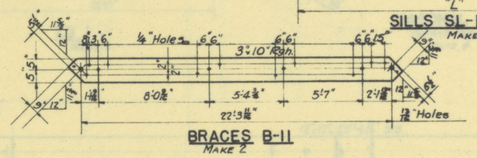
No. Pcs	MARK	L
14	B1	1'-6¾"
11	B2	1'-8½"
68	B3	1'-2½"
14	B4	1'-3½"
1	B5	1'-7½"
6	B6	2'-0"

Note: B6 to be cut to fit in field.



No.	MARK	"A"	"B"	"L"
1	SL1	1'-4⅜"	5'-7⅛"	18'-0"
1	SL2	1'-1⅞"	6'-10⅜"	20'-0"
1	SL3	1'-2⅛"	5'-9⅛"	18'-0"
1	SL4	1'-2⅛"	4'-9⅛"	16'-0"

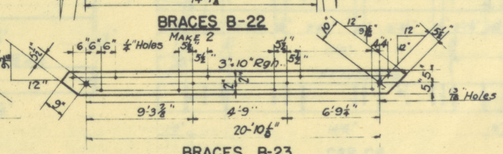
SILLS SL-1-2-3-4
MAKE ONE EACH



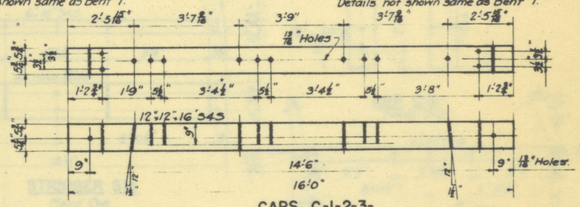
BRACES B-11
MAKE 2

BRACES B-22
MAKE 2

BRACES B-21
MAKE 2



BRACES B-23
MAKE 2



CAPS C-1-2-3-
MAKE ONE EACH.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6 UMPQUA FOREST

SHOP DETAILS
STRINGERS AND APPROACHES
NORTH UMPQUA BRIDGE

DATE: OCT. 10, 1935 SCALE: 1"=1'-0"

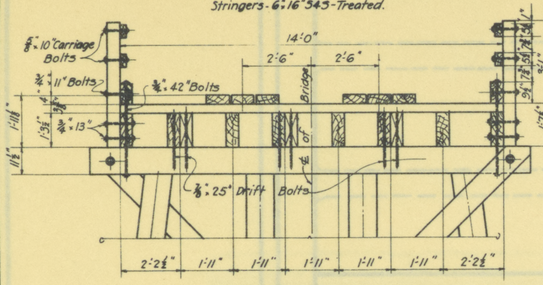
DESIGNED BY W.D.S.
DRAWN BY W.D.S.
TRACED BY W.D.S.
CHECKED BY J.A.T.

APPROVED:
REGIONAL ENGINEER

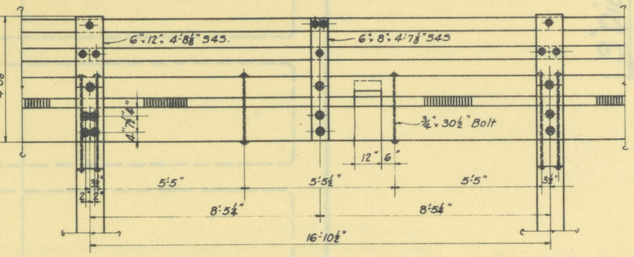
SHEET 7 OF 8 SHEETS

I-P-14

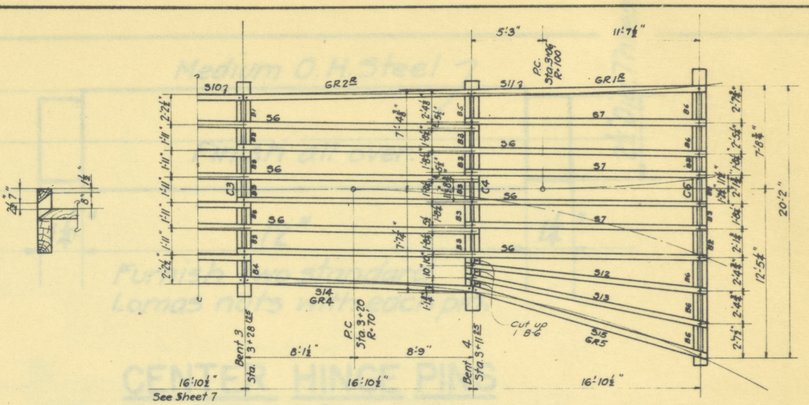
Hand Rail Posts - 6"@8'& 6"@12" 343 Untreated.
Hand Rails - 3"@6" 343 - Untreated.
Guard Rails - 6"@10" 343 - Treated.
Run Plank - 4"@10" Rgh. - Untreated.
Decking - 2"@4" 315 I.E. - Laminated - Treated.
Stringers - 6"@16" 343 - Treated.



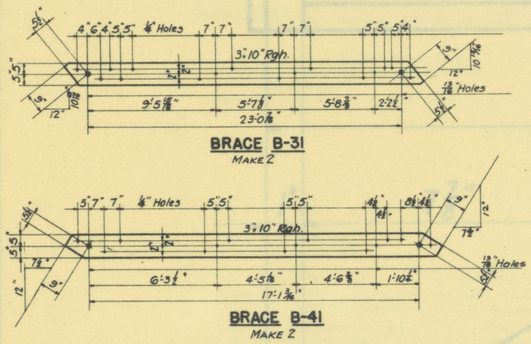
TYPICAL SECTION OF DECK.
½"=1'-0"



ELEVATION OF DECK
½"=1'-0"

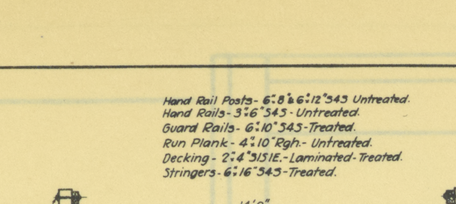


STRINGER PLAN - BENT 3 TO EAST END
Scale ½"=1'-0"



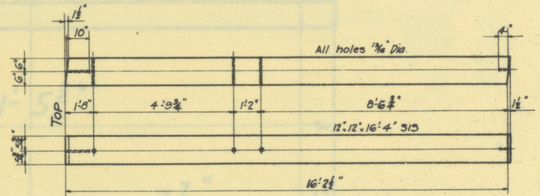
BRACE B-31
MAKE 2

BRACE B-41
MAKE 2

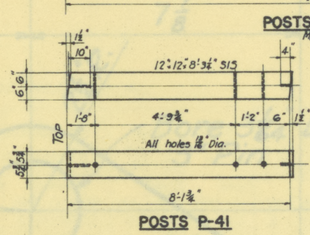


POSTS - P12 - P22 - P32 - P42
MAKE 2 EACH.

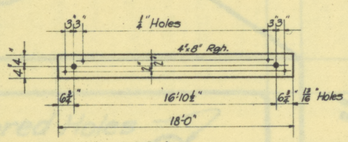
POSTS P11
MAKE 2.



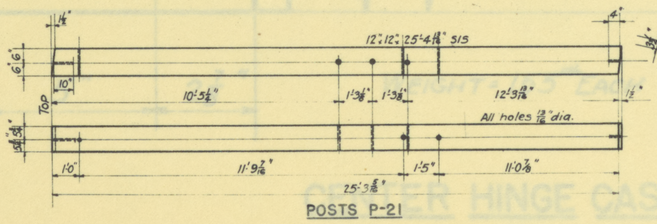
POSTS P-31
MAKE 2



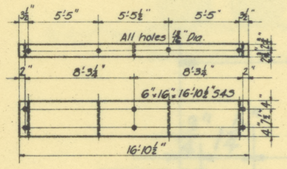
POSTS P-41
MAKE 2



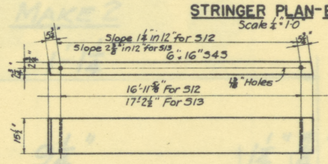
LG 1
MAKE 4.



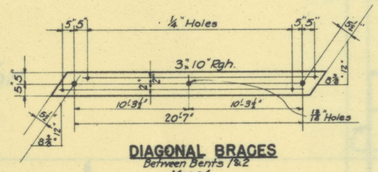
POSTS P-21
MAKE 2



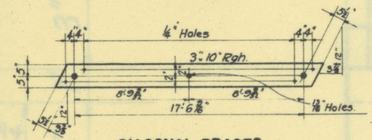
STRINGER S10
MAKE 1



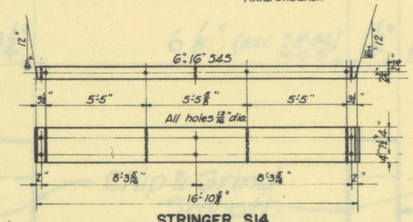
STRINGERS S12 - S13
MAKE ONE EACH



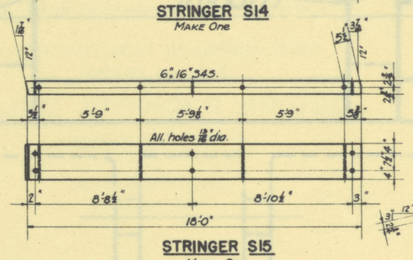
DIAGONAL BRACES
Between Bents 1 & 2
MAKE 4



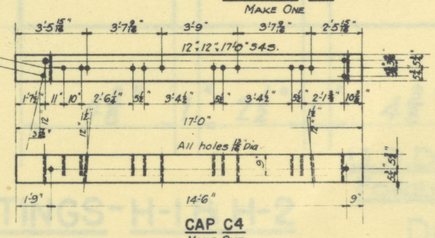
DIAGONAL BRACES.
Between Bents 3 & 4
MAKE 4.



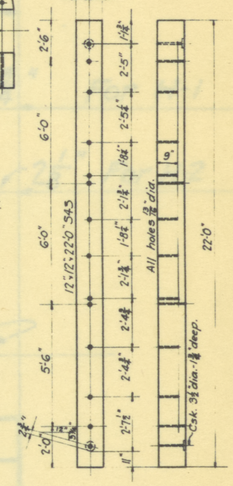
STRINGER S14
MAKE ONE



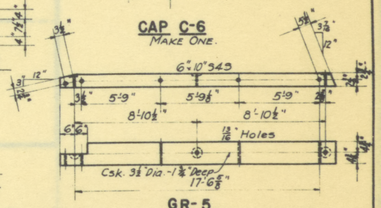
STRINGER S15
MAKE ONE



CAP C4
MAKE ONE



CAP C-6
MAKE ONE.



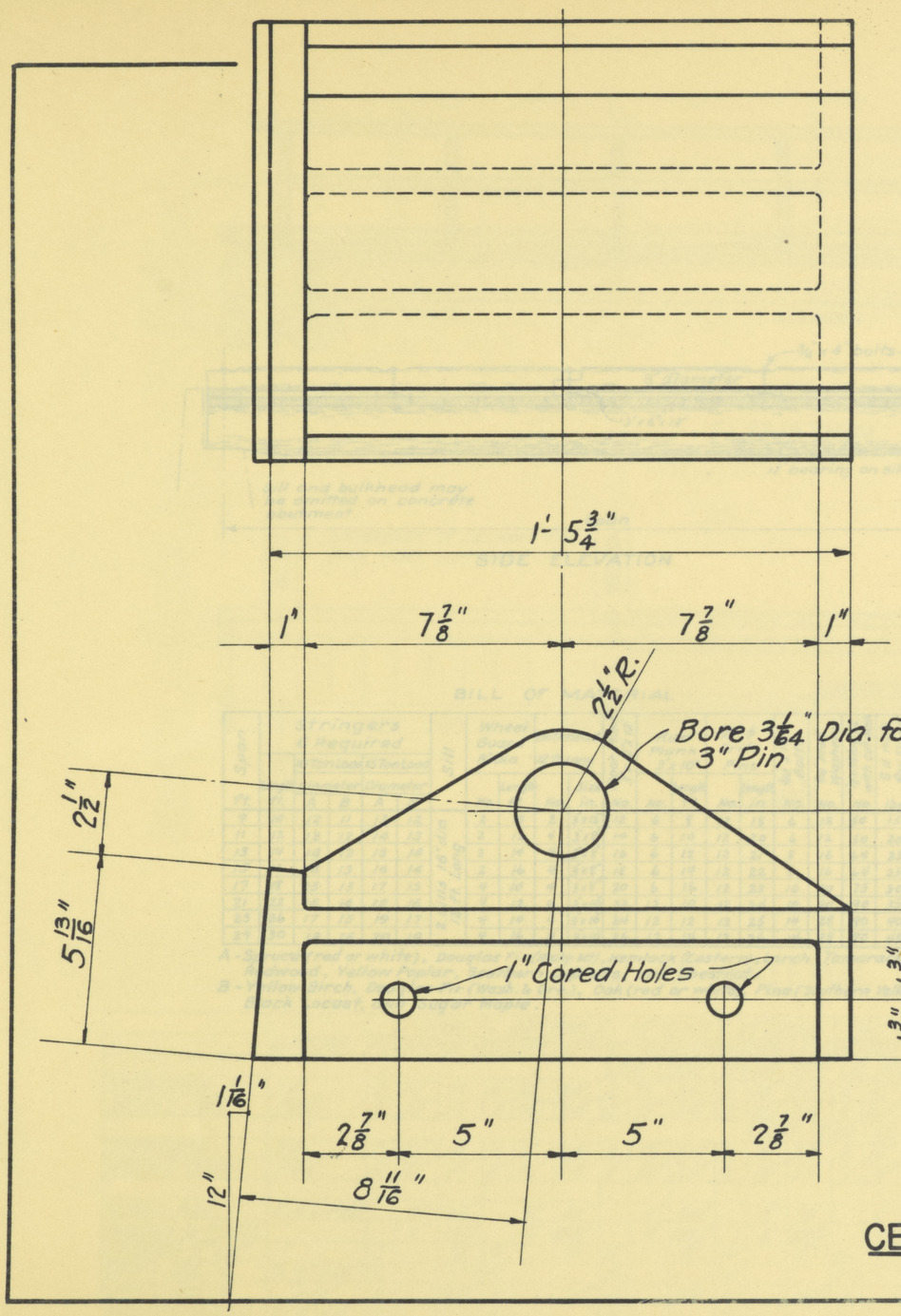
GR-5
MAKE ONE

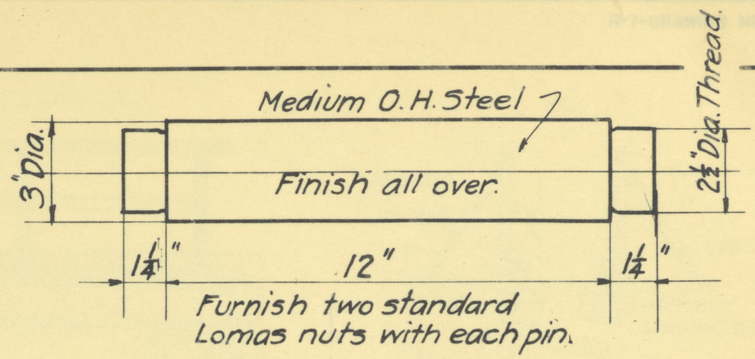
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6 UMPQUA FOREST

SHOP DETAILS
STRINGERS AND APPROACHES
NORTH UMPQUA BRIDGE

DATE: OCT. 10, 1935 SCALE: ½"=1'-0"
DESIGNED BY W.D.S.
DRAWN BY W.D.S.
TRACED BY W.D.S.
CHECKED BY J.A.T.
APPROVED:
REGIONAL ENGINEER.

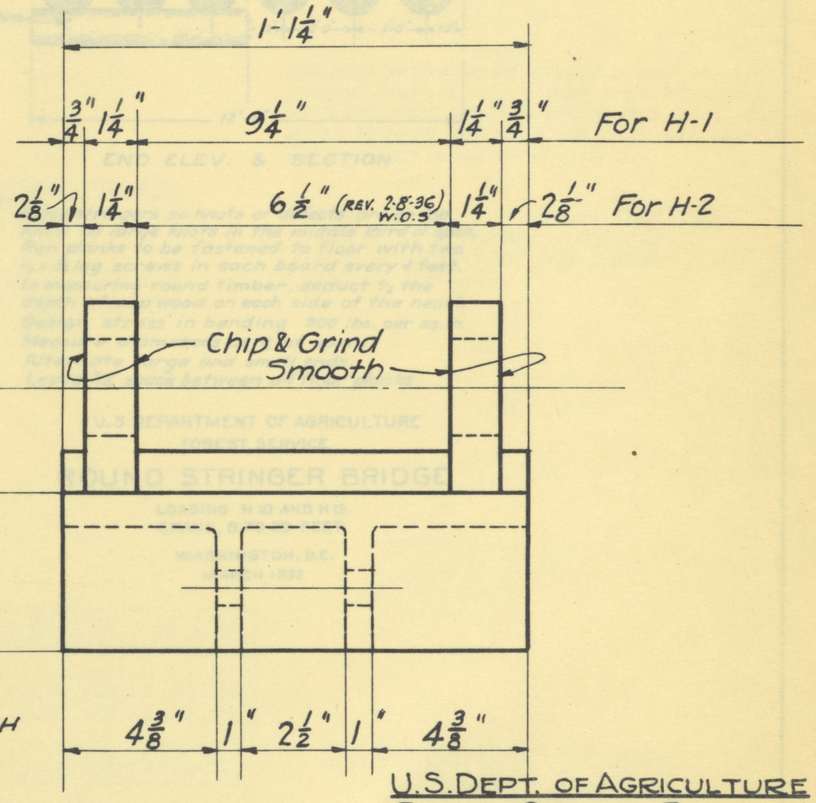
SHEET 8 OF 8 SHEETS. 1-P-14





CENTER HINGE PINS

MAKE 2



WEIGHT = 155 LBS. EACH

CENTER HINGE CASTINGS - H-1 & H-2

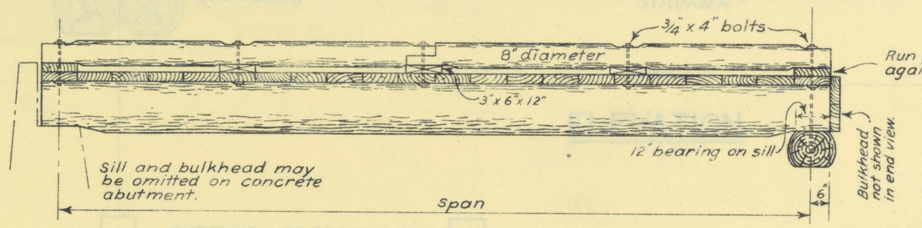
MATERIAL - CAST STEEL - ANNEALED.

MAKE 2 EACH

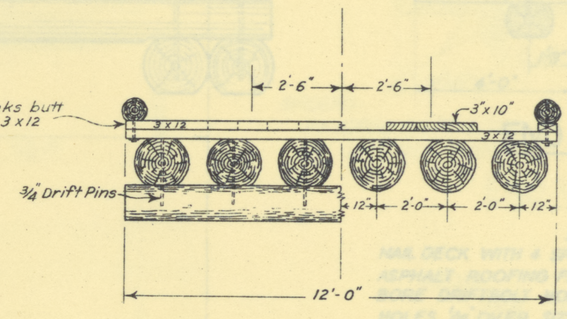
U.S. DEPT. OF AGRICULTURE
FOREST SERVICE - REGION 6

DETAIL OF CENTER HINGE
NORTH UMPQUA RIVER BRIDGE

W.D.S. - 1-14-36



SIDE ELEVATION



END ELEV. & SECTION

BILL OF MATERIAL

Span	Stringers 6 Required					Sill	Wheel Guard 8" Dia		Bulkhead 12 ft. Long		Floor Plank 3"x12"x12'	Run Plank 3"x10"		3/4" ϕ Drift Pins		3/4" x 14" Bolts	3/4" Mall. Washers	1/2" x 5 1/2" Lag Sc. with cut washers	6 d nails for Floor
		10 Ton Load		15 Ton Load															
	Length	Diameter		Diameter			No.	Length	No.	Size		No.	Length	No.	Length				
ft.	ft.	A	B	A	B			ft.		in.	NO.		ft.		in.	No.	No.	No.	lbs.
9	10	12	11	13	12	2 sills 16" dia 12 ft. Long	2	10	2	3"x12"	12	6	8	12	18	6	12	50	15
11	12	13	12	14	13		2	12	4	3"x8"	14	6	10	12	20	6	12	50	20
13	14	14	12	15	14		2	14	4	3"x8"	16	6	12	12	21	8	16	64	25
15	16	14	13	16	14		2	16	4	3"x8"	18	6	14	12	22	8	16	64	25
17	18	15	13	17	15		4	10	4	3"x8"	20	6	16	12	23	10	20	75	30
21	22	16	14	18	16		4	12	4	3"x10"	22	12	10	12	24	10	20	90	35
25	26	17	15	19	17		4	14	4	3"x10"	24	12	12	12	25	14	28	90	40
29	30	18	16	20	18		4	16	4	3"x10"	26	12	14	12	26	14	28	90	45

A - Spruce (red or white), Douglas Fir (Rocky Mt), Hemlock (Eastern), Larch, Tamarack, Redwood, Yellow Poplar, Southern Cypress, and Chestnut.
B - Yellow Birch, Douglas Fir (Wash. & Ore.), Oak (red or white), Pine (Southern Yellow), Black Locust, and Sugar Maple.

Notes:-
Place stringers so knots or defects are on top.
Allow no large knots in the middle third of span.
Run planks to be fastened to floor with two 1/2 x 5 1/2 lag screws in each board every 4 feet.
In measuring round timber, deduct 1/2 the depth of sap wood on each side of the heart.
Design stress in bending 900 lbs. per sq. in.
Measure diameters at ℄ of span.
Alternate large and small ends.
Leave 3/4" space between all floor planks.

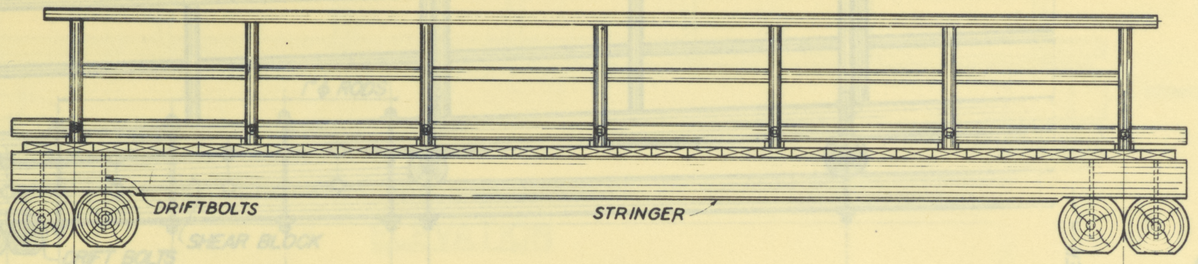
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

ROUND STRINGER BRIDGE

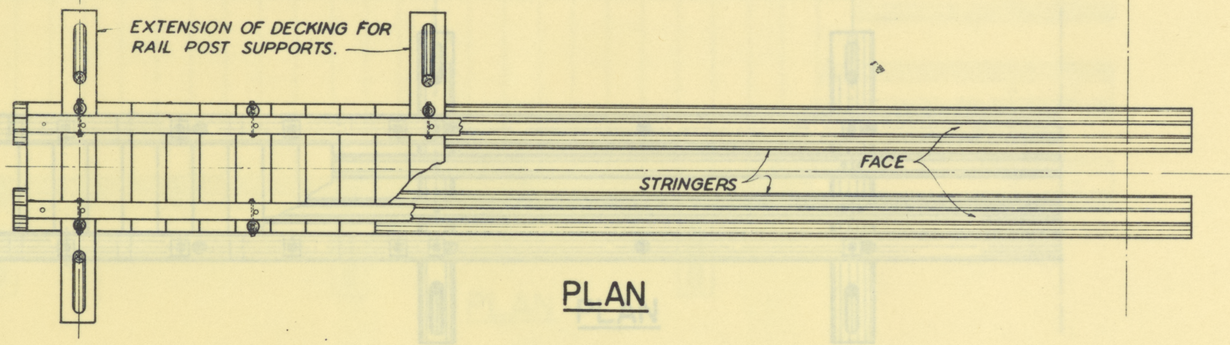
LOADING H 10 AND H 15
SPANS, 9 TO 29 FEET

WASHINGTON, D.C.
MARCH 1932

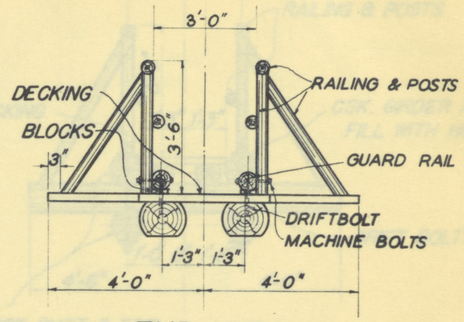
Designed & Drawn - H.R.J.
Traced - J.E.P. Feb. 1932.



ELEVATION



PLAN



END VIEW

NOTES

NAIL DECK WITH 4 SPIKES PER PER PLANK. PLACE ASPHALT ROOFING FELT 12" WIDE OVER STRINGERS. BORE DRIFTBOLT HOLES 1/16" UNDER SIZE. BORE BOLT HOLES 1/16" OVER SIZE. FOR SHEEP TRAVEL USE 4" ROUND POLE RAILS AT 8' C. TO C.

DESIGNED FOR 5 FT. OF SNOW = 200# PER LINEAL FT. OF BRIDGE - LIVE LOAD.
FOR NO SNOW = 50# PER LINEAL FT. OF BRIDGE - LIVE LOAD.

BILL OF MATERIAL

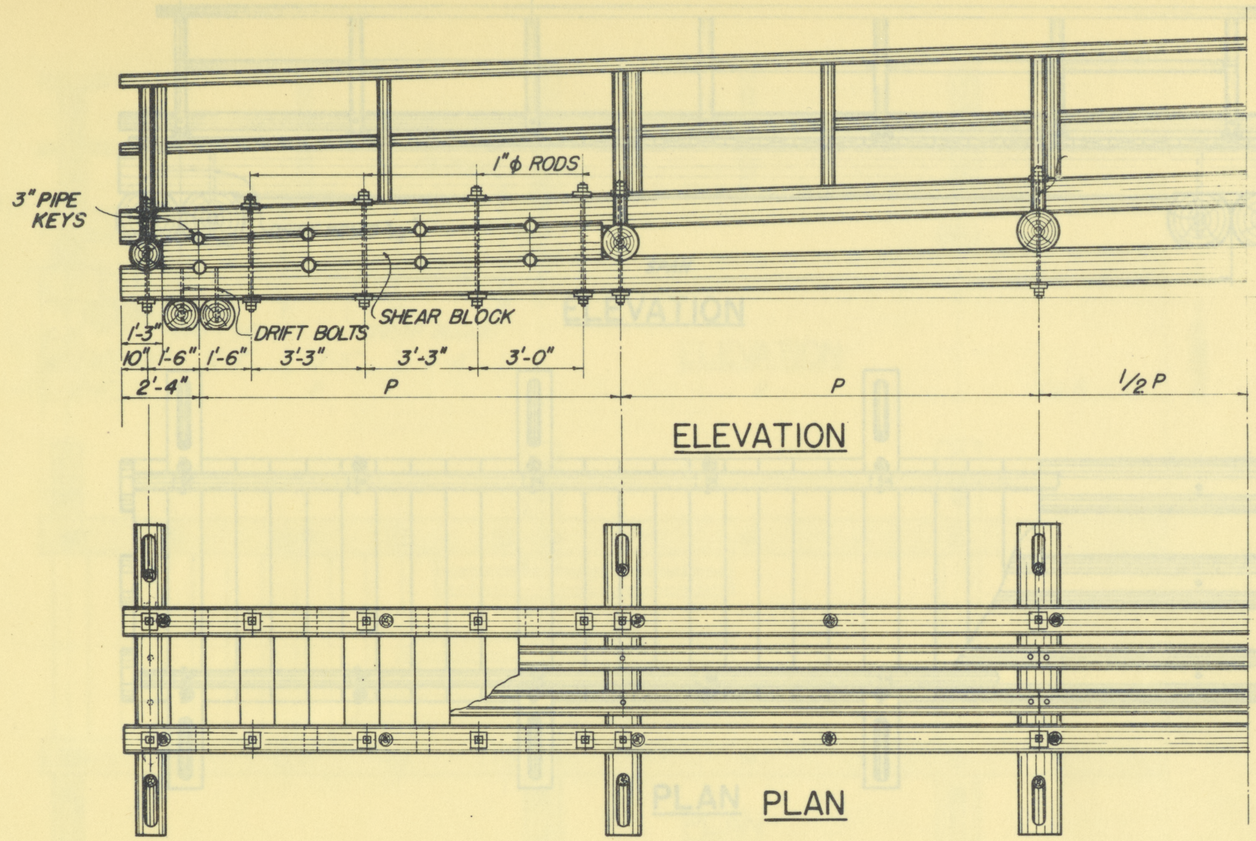
		10' SPAN			20' SPAN			30' SPAN			35' SPAN			40' SPAN			45' SPAN			50' SPAN			55' SPAN			60' SPAN		
	MATERIAL	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.
		LIVE LOAD - SNOW - 200 LB. PER LINEAL FT. OF BRIDGE																										
STRINGERS	FIR	2	10"	14'	2	12"	24'	2	15"	34'	2	18"	39'	2	18"	44'	2	21"	49'	2	21"	54'	2	23"	59'	2	23"	64'
MIDDLE DIAM.	PINE	2	10"	14'	2	14"	24'	2	17"	34'	2	20"	39'	2	20"	44'	2	23"	49'	2	23"	54'	2	26"	59'	2	26"	64'
		LIGHT LOAD - NO SNOW																										
STRINGERS	FIR	2	10"	14'	2	11"	24'	2	13"	34'	2	16"	39'	2	16"	44'	2	18"	49'	2	18"	54'	2	20"	59'	2	20"	64'
MIDDLE DIAM.	PINE	2	10"	14'	2	12"	24'	2	15"	34'	2	18"	39'	2	18"	44'	2	21"	49'	2	21"	54'	2	23"	59'	2	23"	64'
GUARD RAIL	FIR OR PINE		6"	28'		6"	48'		6"	68'		6"	78'		6"	88'		6"	98'		6"	108'		6"	118'		6"	128'
RAILING & POSTS	"		4"	140'		4"	210'		4"	280'		4"	320'		4"	350'		4"	390'		4"	420'		4"	460'		4"	490'
DECKING 2"X12"	"	5		12'	9		12'	12		12'	14		12'	16		12'	17		12'	19		12'	21		12'	23		12'
DRIFT BOLTS	5/8"X16"	6			10			16			18			20			22			24			26			28		
DRIFT BOLTS	3/4"	8		17"	8		20"	8		23"	8		26"	8		26"	8		29"	8		29"	8		31"	8		31"
MACHINE BOLTS	5/8"X12"	6			10			14			16			16			18			20			22			24		
NAILS - GALV.	40D	25#			25#			25#			30#			35#			40#			45#			50#			55#		
ROOFING FELT		1 SQUARE									2 SQUARES																	

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

LOG STRINGER BRIDGE

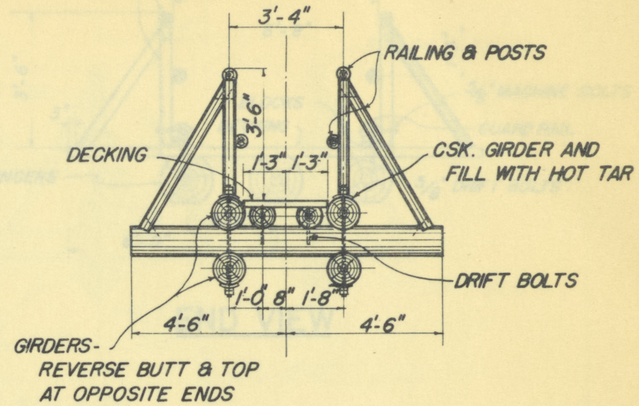
10 TO 60 FT. SPAN
3 FT. ROADWAY
FOOT TRAIL

5-M-26



ELEVATION

PLAN



END VIEW

NOTES:

TREAT HOLES WITH HOT CREOSOTE. AFTER RODS IN PLACE, POUR IN HOT TAR.

FASTEN DECKING WITH 4 SPIKES PER PLANK.

PLACE ASPHALT ROOFING FELT OVER STRINGERS 10" WIDE & OVER FLOORBEAMS 12" WIDE.

BORE ROD HOLES 1/16" OVERSIZE & DRIFT HOLES 1/16" UNDERSIZE.

FOR SHEEP TRAVEL, PARALLEL RAILING WITH 4" ROUND POLES 8" C. TO C. FROM DECK.

STRINGERS MAY BE LAPPED AT FLOORBEAMS.

DESIGNED FOR 5 FT. OF SNOW.
LIVE LOAD - SNOW - = 200# PER LINEAL FT. OF BRIDGE.

BILL OF MATERIAL

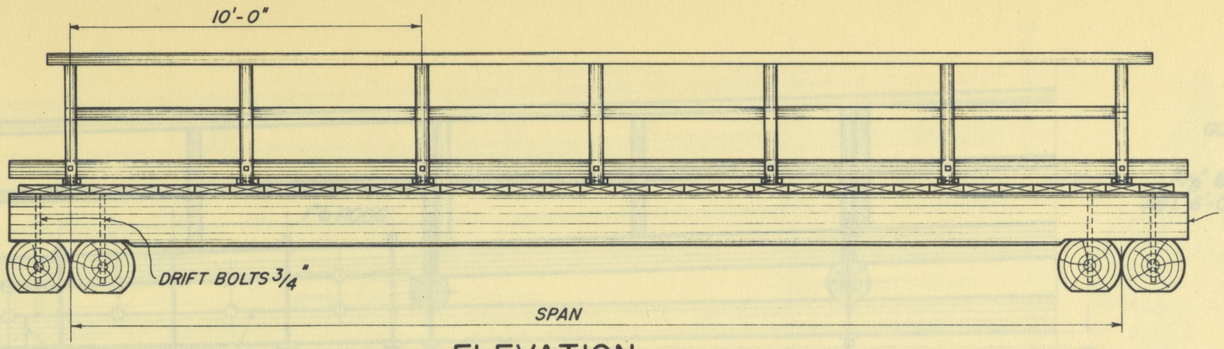
		50' SPAN			55' SPAN			60' SPAN			65' SPAN			70' SPAN			75' SPAN			80' SPAN			85' SPAN			90' SPAN		
NUMBER PANELS		4			4			5			5			5			6			6			7			7		
PANEL LENGTH-P		12'-6"			13'-9"			12'-0"			13'-0"			14'-0"			12'-6"			13'-4"			12'-2"			12'-10"		
INITIAL CAMBER		9"			9"			10"			10"			10"			11"			11"			12"			12"		
	MATERIAL	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.
GIRDERS-MIN. DIA.	FIR	4	10"	55'	4	10"	60'	4	10"	65'	4	10"	70'	4	10"	75'	4	10"	80'	4	10"	85'	4	10"	90'	4	10"	95'
STRINGERS-" "	"	8	8"	14'	8	8"	15'	10	8"	13'	10	8"	14'	10	8"	15'	12	8"	14'	12	8"	15'	14	8"	14'	14	8"	14'
FLOORBEAM-AV. DIA.	"	2	10"	9'	2	10"	9'	2	10"	9'	2	10"	9'	2	10"	9'	2	10"	9'	2	10"	9'	2	10"	9'	2	10"	9'
" " "	"	2	12"	9'	2	12"	9'	2	12"	9'	2	12"	9'	2	12"	9'	2	12"	9'	2	12"	9'	2	12"	9'	2	12"	9'
" " "	"	1	14"	9'	1	14"	9'	2	14"	9'	2	14"	9'	2	14"	9'	2	14"	9'	2	14"	9'	2	14"	9'	2	14"	9'
" " "	"																1	16"	9'	1	16"	9'	2	16"	9'	2	16"	9'
SHEAR BLOCK-"	"	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'
RAILING & POSTS	"		4"	355'		4"	365'		4"	400'		4"	410'		4"	420'		4"	455'		4"	465'		4"	500'		4"	510'
DECKING 2"X12"	"	13		10'	15		10'	16		10'	17		10'	18		10'	20		10'	21		10'	22		10'	23		10'
TAR		25 POUNDS																										
KEYS		EXTRA HEAVY GALVANIZED IRON PIPE - 3" DIA. - 9" LONG. 32 REQUIRED																										
RODS - AV. LENGTH	1"X4'-6"	26			26			28			28			28			30			30			32			32		
HEX. NUTS	1"	104			104			112			112			112			120			120			128			128		
WASHERS	6"X6"X1/2"	52			52			56			56			56			60			60			64			64		
DRIFT BOLTS	3/4"X18"	18			18			20			20			20			22			22			24			24		
NAILS-GALV.	40.D	40#			40#			50#			50#			50#			60#			60#			70#			70#		
ROOFING FELT		2 SQUARES																		3 SQUARES								

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

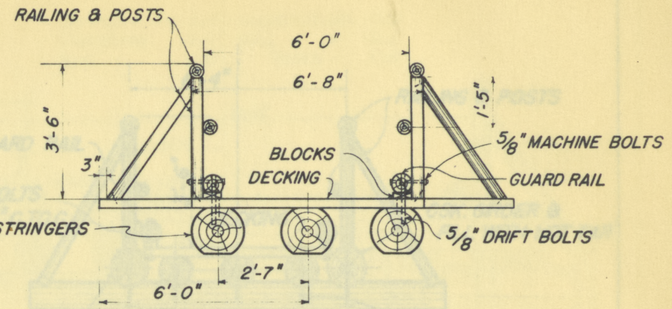
DOUBLE LOG GIRDER BRIDGE

50 TO 90 FT. SPAN
3 FT. ROADWAY
FOOT TRAIL

5-M-28



ELEVATION



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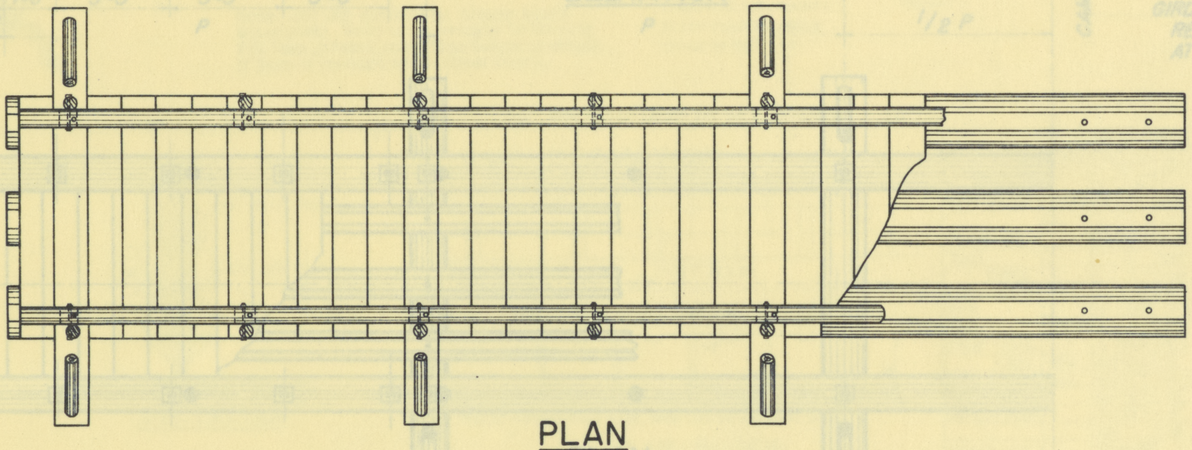


PLAN

NOTES:
- FASTEN DECKING WITH 5 SPIKES PER PLANK
- PLACE ASPHALT ROOFING FELT 12" WIDE OVER STRINGERS.
- BORE DRIFT HOLES 1/16" UNDER SIZE.
- FOR SHEEP TRAVEL, PARALLEL RAILING WITH 4" ROUND POLES 8" C. TO C. FROM DECK.

BILL OF MATERIAL

		10' SPAN			15' SPAN			20' SPAN			25' SPAN			30' SPAN			35' SPAN			40' SPAN			45' SPAN			50' SPAN		
	MATERIAL	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.
STRINGERS (MIDDLE DIAM.)	FIR	3	10"	14'	3	12"	19'	3	12"	24'	3	15"	29'	3	15"	34'	3	18"	39'	3	18"	44'	3	20"	49'	3	20"	54'
	PINE	3	10"	14'	3	13"	19'	3	13"	24'	3	17"	29'	3	17"	34'	3	20"	39'	3	20"	44'	3	23"	49'	3	23"	54'
GUARD RAIL	FIR OR PINE		6"	28'		6"	38'		6"	48'		6"	58'		6"	68'		6"	78'		6"	88'		6"	98'		6"	108'
RAILING & POSTS	"		4"	140'		4"	180'		4"	210'		4"	250'		4"	280'		4"	320'		4"	350'		4"	390'		4"	420'
DECKING 3"X12"	"	8		12'	11		12'	14		12'	17		12'	20		12'	23		12'	26		12'	29		12'	32		12'
DRIFT BOLTS	5/8"X 18"	6			10			12			14			18			20			22			24			26		
DRIFT BOLTS	3/4"	12		17"	12		19"	12		19"	12		23"	12		23"	12		26"	12		26"	12		28"	12		28"
MACHINE BOLTS	5/8"X 12"	6			8			10			12			14			16			16			18			20		
NAILS-GALV.	40D	15 #			20 #			25 #			30 #			30 #			40 #			40 #			45 #			50 #		
ROOFING FELT		1 SQUARE									2 SQUARES									3 SQUARES								

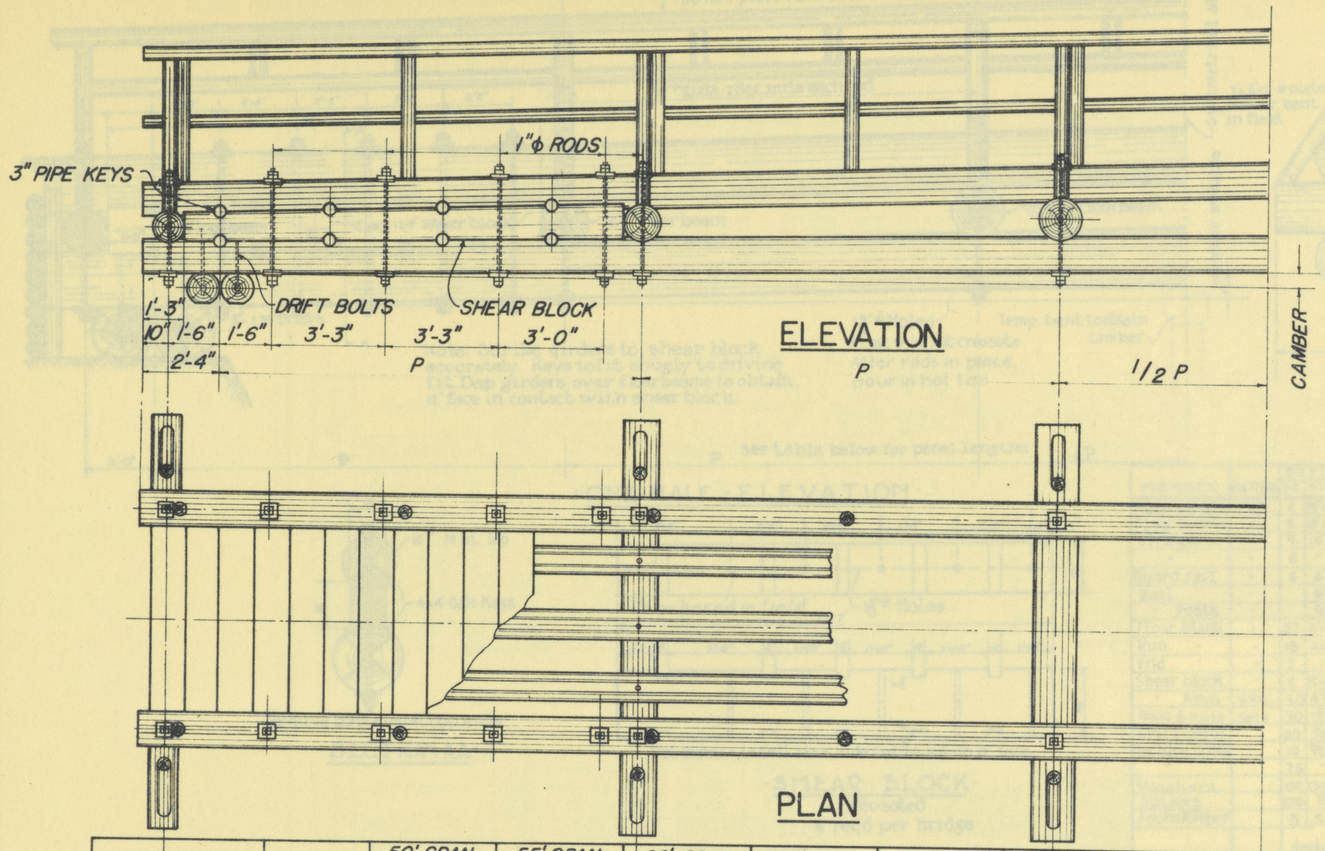
DESIGNED FOR 5 FT. OF SNOW.
SNOW LIVE LOAD = 350# PER LINEAL FOOT OF BRIDGE.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

LOG STRINGER BRIDGE

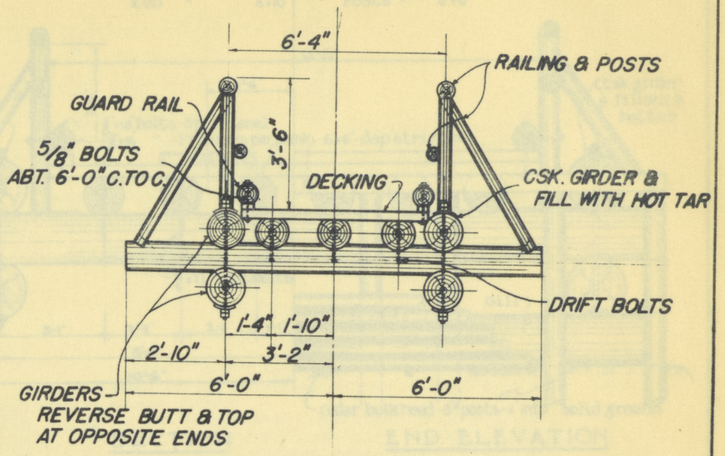
10 TO 50 FT. SPAN
6 FT. ROADWAY
HORSE TRAIL

5-M-27



ELEVATION

PLAN



END VIEW

		50' SPAN	55' SPAN	60' SPAN	65' SPAN	70' SPAN	75' SPAN	80' SPAN	85' SPAN	90' SPAN
NUMBER PANELS		4	4	5	5	5	6	6	7	7
PANEL LENGTH-P		12'-6"	13'-9"	12'-0"	13'-0"	14'-0"	12'-6"	13'-4"	12'-2"	12'-10"
INITIAL CAMBER		9"	9"	10"	10"	10"	11"	11"	12"	12"

	MATERIAL	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.	NO.	SIZE	LGTH.
GIRDERS-MIN. DIA.	FIR	4	10"	55'	4	10"	60'	4	11"	65'	4	11"	70'	4	11"	75'	4	11"	80'	4	11"	85'	4	11"	90'	4	11"	95'
STRINGERS-" "	"	12	8"	14'	12	8"	15'	15	8"	13'	15	8"	14'	15	8"	15'	18	8"	14'	18	8"	15'	21	8"	14'	21	8"	14'
FLOORBEAM-AV. DIA.	"	2	10"	12'	2	10"	12'	2	10"	12'	2	10"	12'	2	10"	12'	2	10"	12'	2	10"	12'	2	10"	12'	2	10"	12'
" " "	"	2	12"	12'	2	12"	12'	2	12"	12'	2	12"	12'	2	12"	12'	2	12"	12'	2	12"	12'	2	12"	12'	2	12"	12'
" " "	"	1	14"	12'	1	14"	12'	2	14"	12'	2	14"	12'	2	14"	12'	2	14"	12'	2	14"	12'	2	14"	12'	2	14"	12'
" " "	"																1	16"	12'	1	16"	12'	2	16"	12'	2	16"	12'
SHEARBLOCK-" "	"	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'	4	12"	13'
GUARD RAIL	"		6"	110'		6"	120'		6"	130'		6"	140'		6"	150'		6"	160'		6"	170'		6"	180'		6"	190'
RAILING & POSTS	"		4"	400'		4"	430'		4"	470'		4"	490'		4"	510'		4"	530'		4"	580'		4"	610'		4"	640'
DECKING-3"X12"	"	18		18'	19		18'	21		18'	23		18'	24		18'	26		18'	28		18'	29		18'	31		18'
TAR		25 POUNDS																										
KEYS		EXTRA HEAVY GALVANIZED IRON PIPE - 3" DIA. 9" LONG. 32 REQUIRED																										
RODS-AV. LENGTH		26	1"	4'-6"	26	1"	4'-6"	28	1"	4'-6"	28	1"	4'-6"		1"	4'-6"	30	1"	4'-6"	30	1"	4'-6"	32	1"	4'-6"	32	1"	4'-6"
HEX. NUTS		104	1"		104	1"		112	1"		112	1"		112	1"		120	1"		120	1"		128	1"		128	1"	
WASHERS	6"X6"X1/2"	52			52			56			56			56			60			60			64			64		
DRIFT BOLTS	3/4"X18"	23			23			26			26			26			29			29			32			32		
MACHINE BOLTS	5/8"X14"	20			22			24			24			26			28			30			32			34		
SPIKES	60D-6"	325			350			375			425			450			475			500			525			550		
NAILS	40D	20#			20#			25#			25#			25#			30#			30#			35#			35#		
ROOFING FELT		3 SQUARES																		4 SQUARES								

NOTES:

TREAT HOLES WITH HOT CREOSOTE. AFTER RODS IN PLACE, POUR IN HOT TAR.

FASTEN DECKING WITH 5 SPIKES PER PLANK.

PLACE ASPHALT ROOFING FELT OVER STRINGERS 10" WIDE & OVER FLOORBEAMS 12" WIDE.

BORE ROD HOLES 1/16" OVERSIZE & DRIFT HOLES 1/16" UNDERSIZE.

FOR SHEEP TRAVEL, PARALLEL RAILING WITH 4" ROUND POLES 8" C. TO C. FROM DECK.

.STRINGERS MAY BE LAPPED AT FLOOR-BEAMS.

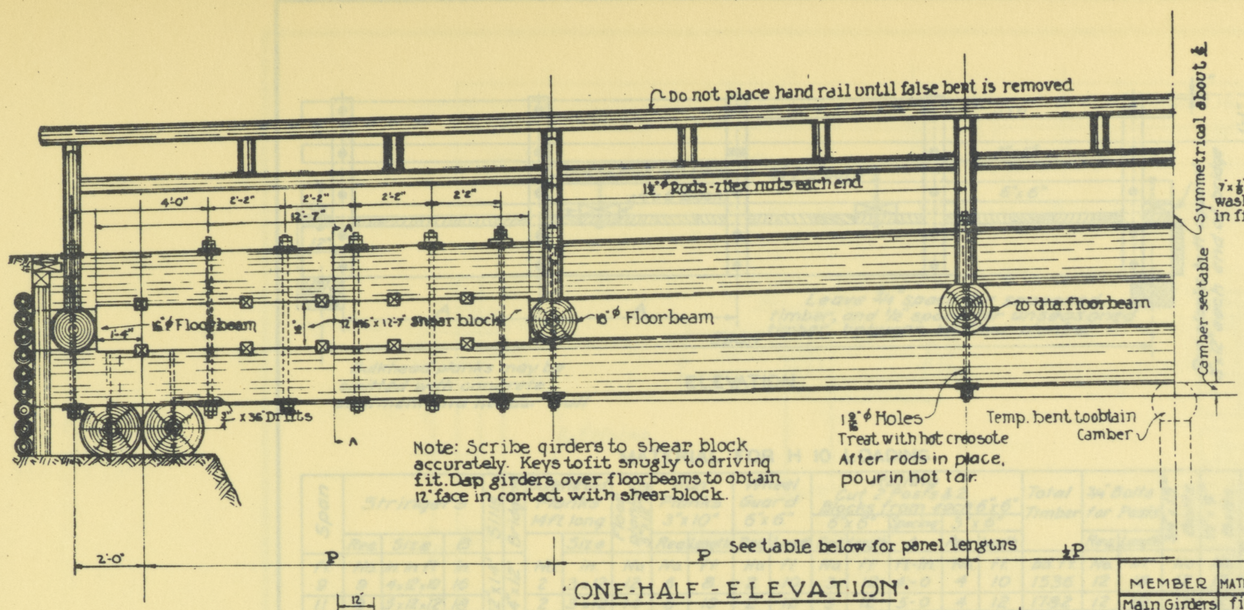
DESIGNED FOR 5 FT. OF SNOW.
LIVE LOAD-SNOW- = 350 LBS. PER LINEAL FT. OF BRIDGE.

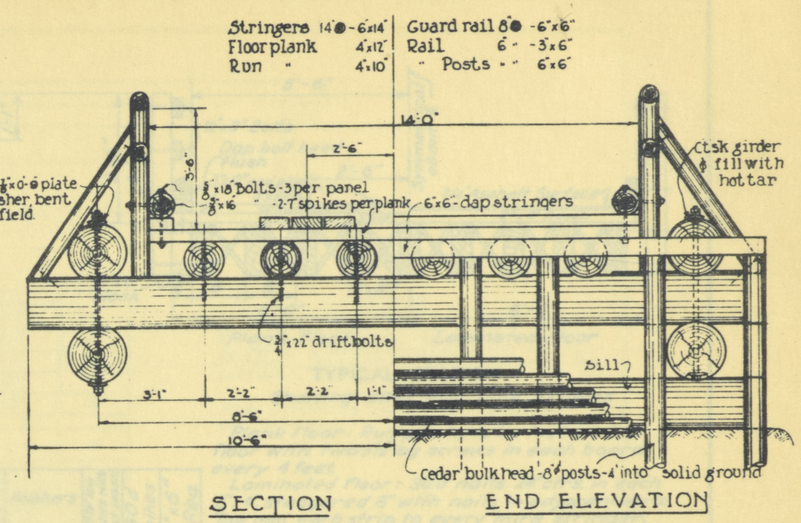
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

DOUBLE LOG GIRDER BRIDGE

50 TO 90 FT. SPAN
6 FT. ROADWAY
HORSE TRAIL

5-M-29

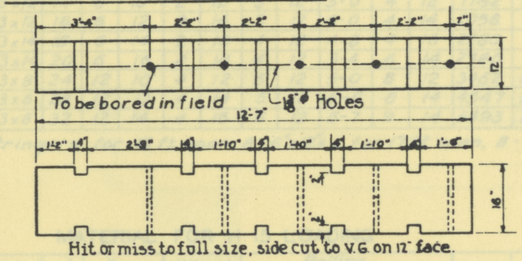




SECTION

END ELEVATION

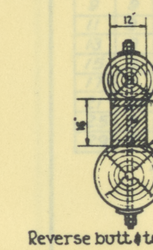
ONE-HALF - ELEVATION



Hit or miss to full size, side cut to V.G. on 12" face.

SHEAR BLOCK

Creosoted
4 req'd per bridge



Reverse butt ϕ top at opp. ends

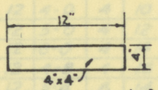
SECTION AA

MEMBER	MATERIAL	50 FT. SPAN NO	SIZE	LENGTH	55 FT. SPAN NO	SIZE	LENGTH	60 FT. SPAN NO	SIZE	LENGTH	65 FT. SPAN NO	SIZE	LENGTH	70 FT. SPAN NO	SIZE	LENGTH	75 FT. SPAN NO	SIZE	LENGTH	80 FT. SPAN NO	SIZE	LENGTH
Main Girders	Fir	4	18" Top	56'-0"	4	18" Top	61'-0"	4	18" Top	66'-0"	4	18" Top	71'-0"	4	18" Top	76'-0"	4	18" Top	81'-0"	4	18" Top	86'-0"
Floor beams	"	5	18" Av.	21'-0"	5	18" Av.	21'-0"	6	18" Av.	21'-0"	6	18" Av.	21'-0"	6	18" Av.	21'-0"	7	18" Av.	21'-0"	7	18" Av.	21'-0"
Stringers	"	9	14"	27'-0"	9	14"	30'-0"	12	14"ϕ	26'-0"	12	14"	28'-0"	12	14"	30'-0"	15	14"	26'-0"	15	14"	29'-0"
"	"	6	"	15'-0"	6	"	16'-0"	6	"	14'-0"	6	"	15'-0"	6	"	16'-0"	6	"	15'-0"	6	"	16'-0"
Guard rail	"	6	8"	18'-0"	6	8"	20'-0"	8	8"	16'-0"	8	8"	18'-0"	8	8"	19'-0"	8	8"	20'-0"	8	8"	22'-0"
Rail	"		6"	220'		6"	240'		6"	260'		6"	280'		6"	300'		6"	320'		6"	340'
" Posts	"		6"	110'		6"	110'		6"	135'		6"	135'		6"	135'		6"	160'		6"	160'
Floor plank	"	52	4"x12"	14'-0"	57	4"x12"	14'-0"	62	4"x12"	14'-0"	67	4"x12"	14'-0"	72	4"x12"	14'-0"	77	4"x12"	14'-0"	82	4"x12"	14'-0"
Run "	"	18	4"x10"	18'-0"	20	4"x10"	18'-0"	24	4"x10"	16'-0"	21	4"x10"	20'-0"	23	4"x10"	20'-0"	24	4"x10"	20'-0"	36	4"x10"	14'-0"
End "	"	2	"	14'-0"	2	"	14'-0"	2	"	14'-0"	2	"	14'-0"	2	4"x10"	14'-0"	2	4"x10"	14'-0"	2	4"x10"	14'-0"
Shear block	"	4	12"x16"	12'-7"	4	12"x16"	12'-7"	4	12"x16"	12'-7"	4	12"x16"	12'-7"	4	12"x16"	12'-7"	4	12"x16"	12'-7"	4	12"x16"	12'-7"
" Keys	OAK	40	4"x4"	12"	40	4"x4"	12"	40	4"x4"	12"	40	4"x4"	12"	40	4"x4"	12"	40	4"x4"	12"	40	4"x4"	12"
Rods & Nuts	Sets	30	1½"ϕ	6'-0" Av.	30	1½"ϕ	6'-0" Av.	32	1½"ϕ	6'-0" Av.	32	1½"ϕ	6'-0" Av.	32	1½"ϕ	6'-0" Av.	34	1½"ϕ	6'-0" Av.	34	1½"ϕ	6'-0" Av.
Drift bolts		50	¾"ϕ	22"	50	¾"ϕ	22"	60	¾"ϕ	22"	60	¾"ϕ	22"	60	¾"ϕ	22"	70	¾"ϕ	22"	70	¾"ϕ	22"
Machine bolts		10	⅝"ϕ	16"	10	⅝"ϕ	16"	12	⅝"ϕ	16"	12	⅝"ϕ	16"	12	⅝"ϕ	16"	14	⅝"ϕ	16"	14	⅝"ϕ	16"
" "		26	"	18"	26	"	18"	32	"	18"	32	"	18"	32	"	18"	38	"	18"	38	"	18"
Washers		60	7"x2½"x⅜"		60	7"x2½"x⅜"		64	7"x2½"x⅜"		64	7"x2½"x⅜"		64	7"x2½"x⅜"		68	7"x2½"x⅜"		68	7"x2½"x⅜"	
Spikes		1000	7/16"	7"	1100	7/16"	7"	1200	7/16"	7"	1300	7/16"	7"	1400	7/16"	7"	1500	7/16"	7"	1600	7/16"	7"
Asphalt Paper		5	Squares		5			6			6			6			7			7		
Stringer Arrangement											See 60 Ft.			See 60 Ft.			See 60 Ft.					

If sawn stringers are used they shall be 8 rows - 6"x14"
Bore 1⅛"ϕ holes for ¾" drift bolts. Place asphalt roofing felt over stringers 12" wide ϕ over floor beams 16" wide.

SPAN	NO. OF PANELS	PANEL LENGTH	GIRDERS LENGTH	GIRDERS MIN. DIA.	SHEAR BLOCK SIZE	SHEAR BLOCK LENGTH	INITIAL CAMBER
50 FT.	4	12'-6"	56'-0"	16" TOP	12"x16"	12'-7"	9"
55 "	4	13'-9"	61'-0"	" "	"	"	10"
60 "	5	12'-0"	66'-0"	" "	"	"	10"
65 "	5	13'-0"	71'-0	" "	"	"	11"
70 "	5	14'-0"	76'-0"	" "	"	"	11"
75 "	6	12'-6"	81'-0"	" "	"	"	12"
80 "	6	13'-4"	86'-0"	" "	"	"	12"

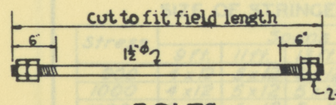
This type bridge shall not be used for spans longer than 80 feet without special permission from the Regional Engineer.



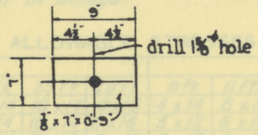
K.D. Oak - creosoted.

SHEAR KEY

40 req'd



BOLTS



WASHERS

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

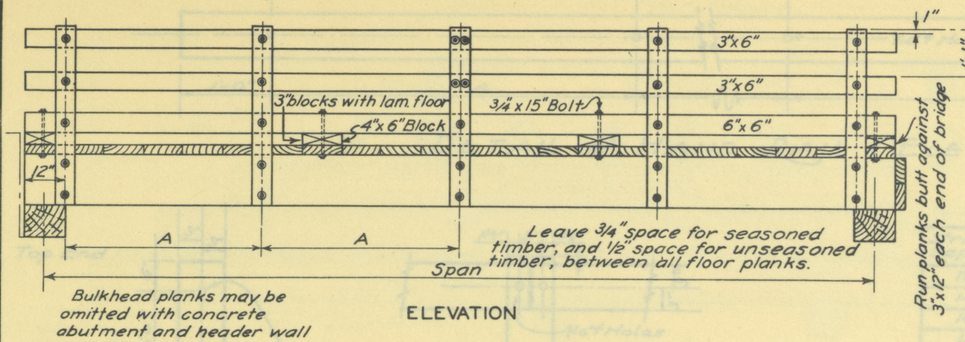
DOUBLE-LOG-GIRDER-BRIDGE

· 50 TO 80 FT. SPAN ·
14 FT. ROADWAY.
H-15 LOADING.

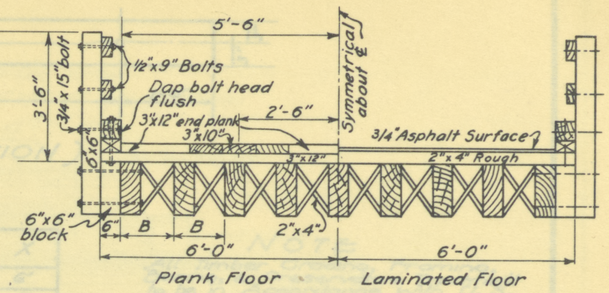
DRAWN BY J.W.O. CHECKED BY DEC. 1934

REVISED JAN. 1935.

9-5-40



ELEVATION



TYPICAL SECTION

Showing alternate floor systems

MATERIAL FOR H 10 LOADING

Span	Stringers			Sills	Bridging	Bulkhead Planks 14 ft. long		Floor planks 3"x12" x16'	Run Planks 3"x10"		Wheel Guard 6"x6"		Railing Cut 2 Posts & 2 Blocks from each 6"x6"					Total Timber	3/4" Bolts for Posts		3/4"x15" Bolts	1/2"x9" Bolts	Washers		1/2"x5 1/2" lag screws with 1/2" cut washers	60d Spikes	4"x6" 1 Reg.
													6"x6"		Spacing	3"x6"											
	Req.	Size	B			No.	Size		Req.	Length	Req.	Length	Req.	Length	A	Req.	Length		Req.	Length			3/4"	1/2"			
ft.	No.	in. in. ft	in.			No.	in.	No	No.	ft.	No.	ft.	No.	ft.	ft-in.	No.	ft.	bd. ft.	No.	in.	No	No.	No.	No.	No.	lbs.	Lg. Ft.
9	9	4x12x10	16	Two-10"x12"x14' 4-2"x4"x12'	2 - 2"x4"x12'	2	3x12	12	6	8	2	10	3	12	4-0	4	10	1536	12	18	12	12	48	24	50	35	8
11	8	5x12x12	18			2	3x12	14	6	10	2	12	3	12	5-0	4	12	1782	12	19	12	12	48	24	50	40	8
13	9	5x12x14	16			2	3x12	16	6	12	2	14	3	12	6-0	4	14	2058	12	19	12	12	48	24	64	45	8
15	9	4x14x16	16			2	3x14	18	6	14	2	16	4	12	4-8	4	16	2280	16	18	14	16	60	32	64	50	10
17	8	6x14x18	18			2	3x14	20	6	16	2	18	4	12	5-4	6	14	2760	16	20	14	20	60	40	75	55	10
21	9	6x14x22	15 3/4			4	3x8	24	12	10	4	12	5	12	5-0	8	12	3462	20	20	20	24	80	48	90	65	10
25	8	8x16x26	17 3/4			4	3x8	28	12	12	4	14	5	12	6-0	8	14	4547	20	22	20	24	80	48	90	75	10
29	9	8x16x30	15 1/2			4	3x8	32	12	14	4	16	6	12	5-7	9	14	5493	24	22	22	28	92	56	90	80	10

Note: Alternate stringers for 15 ft. span, 8 - 6"x12"s ; for 17 ft. span, 8 - 8"x12"s.

MATERIAL FOR H 15 LOADING

Span	Stringers			Sills	Bridging	Bulkhead Planks 14 ft. long		Floor planks 3"x12" x16'	Run Planks 3"x10"		Wheel Guard 6"x6"		Railing Cut 2 Posts & 2 Blocks from each 6"x6"					Total Timber	3/4" Bolts for Posts		3/4"x15" Bolts	1/2"x9" Bolts	Washers		1/2"x5 1/2" lag screws with 1/2" cut washers	60d Spikes	4"x6" 1 Reg.
													6"x6"		Spacing	3"x6"											
	Req.	Size	B			No.	Size		Req.	Length	Req.	Length	Req.	Length	A	Req.	Length		Req.	Length			3/4"	1/2"			
ft.	No.	in. in. ft	in.			No.	in.	No.	No.	ft.	No.	ft.	No.	ft.	ft-in.	No.	ft.	bd. ft.	No.	in.	No	No.	No.	No.	No.	lbs.	Lg. Ft.
9	9	5x12x10	16	Two-10"x12"x14' 4-2"x4"x12'	2 - 2"x4"x12'	2	3x12	12	6	8	2	10	3	12	4-0	4	10	1626	12	19	12	12	48	24	50	35	8
11	9	6x12x12	15 3/4			2	3x14	14	6	10	2	12	3	12	5-0	4	12	1964	12	20	12	12	48	24	50	40	8
13	8	6x14x14	18			2	3x14	16	6	12	2	14	3	12	6-0	4	14	2226	12	22	12	12	48	24	64	45	8
15	8	8x14x16	17 3/4			2	3x14	18	6	14	2	16	4	12	4-8	4	16	2803	16	22	14	16	60	32	64	50	10
17	8	8x14x18	17 3/4			4	3x8	20	6	16	2	18	4	12	5-4	6	14	3110	16	22	14	20	60	40	75	55	10
21	8	8x16x22	17 3/4			4	3x8	24	12	10	4	12	5	12	5-0	8	12	3954	20	22	20	24	80	48	90	65	10
25	8	10x16x26	17 1/2			4	3x10	28	12	12	4	14	5	12	6-0	8	14	5130	20	24	20	24	80	48	90	75	10
29	8	10x18x30	17 1/2			4	3x10	32	12	14	4	16	6	12	5-7	9	14	6241	24	24	22	28	92	56	90	80	10

Note: Alternate stringers for 11' span 8 - 6"x14"s; for 13' span 8 - 8"x12"s; for 15' span 8 - 10"x12"s. Bills of material are for plank floor. For laminated floor, omit floor planks, run planks, lag screws and 60d spikes; and order six 2"x4"x12's, 3 lbs. of 30d nails, and 1 gal. of asphalt for each linear foot of bridge.

SIZE OF STRINGERS FOR VARIOUS ALLOWABLE STRESSES - 9 STRINGERS REQUIRED

Stress	Spans for H10 Loading								Spans for H-15 Loading							
	9 ft.	11 ft.	13 ft.	15 ft.	17 ft.	21 ft.	25 ft.	29 ft.	9 ft.	11 ft.	13 ft.	15 ft.	17 ft.	21 ft.	25 ft.	29 ft.
900	4 x 12	5 x 12	6 x 12	6 x 12	6 x 14	8 x 14	10 x 14	10 x 16	4 x 14	6 x 14	6 x 14	8 x 14	8 x 14	8 x 16	10 x 16	10 x 18
1000	4 x 12	5 x 12	5 x 12	4 x 14	6 x 14	6 x 14	10 x 14	8 x 16	5 x 12	6 x 12	6 x 14	8 x 14	8 x 14	8 x 16	10 x 16	10 x 18
1100	3 x 12	4 x 12	5 x 12	5 x 12	6 x 14	6 x 14	8 x 14	8 x 16	5 x 12	4 x 14	6 x 14	6 x 14	8 x 14	8 x 16	8 x 16	10 x 16
1200	3 x 12	4 x 12	4 x 12	5 x 12	6 x 12	6 x 14	8 x 14	8 x 16	4 x 12	5 x 12	6 x 12	6 x 14	6 x 14	8 x 14	8 x 16	10 x 16
1300	3 x 12	4 x 12	4 x 12	5 x 12	4 x 14	6 x 14	8 x 14	6 x 16	4 x 12	5 x 12	4 x 14	6 x 14	6 x 14	8 x 14	8 x 16	8 x 16
1400	3 x 12	4 x 12	4 x 12	4 x 12	5 x 12	6 x 12	6 x 14	8 x 14	4 x 12	5 x 12	5 x 12	6 x 12	6 x 14	8 x 14	8 x 14	8 x 16
1500	3 x 12	3 x 12	4 x 12	4 x 12	4 x 12	4 x 14	6 x 14	8 x 14	4 x 12	4 x 12	5 x 12	6 x 12	6 x 14	8 x 14	8 x 14	8 x 16

Revised 5-26-36

Plank floor: Run planks to be fastened to floor with two 5 1/2" lag screws in each board every 4 feet.

Laminated Floor: 30d nails 24" ctrs. in each 2"x4", staggered 8" with nails in adjacent strip. Toe nail each strip to every third stringer, staggered so that spacing of nails along stringer is 6 inches.

Bolt holes to be drilled with bit 1/16" smaller than diameter of bolt. Use malleable washers on Handrail bolts, other bolts use O. G. washers.

All joints and contact surfaces should be treated with creosote or asphaltum paint before assembling.

For multiple spans, use sill for bent cap. Butt outside stringers, lap inside stringers.

Design stress in bending 1000# per sq. in.

Eliminate bridging on 9 ft. Span, place one line at center of Span on 11, 13, 15, 17 ft. Spans; 2 lines equally spaced on Spans of 19, 21, and 25 ft., and 3 lines equally spaced on 29 ft. Span.

SUITABLE TIMBER FOR STRINGERS OF SIZE AND NUMBER REQUIRED IN BILL OF MATERIAL

Species	Grade	Allowable Stress
Douglas Fir	Sel. St. Beams & Str.	1400#f
Sou. Yellow Pine	St. Sq. E. & S.	1600#f
Sou. Cypress	St. Heart J. & P.	1400#f
Oak (Red or White)	Sel. Dimension	1400#f

Note:
See Dwg. B-1502 for Fabricating Details

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION EIGHT

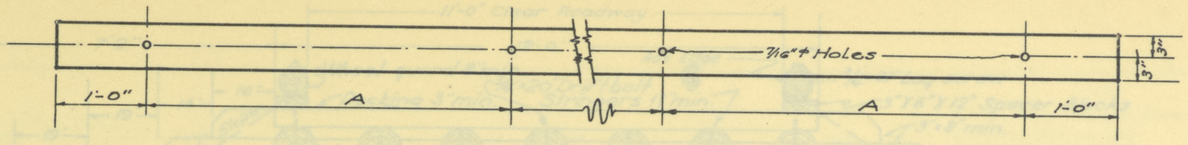
TIMBER BEAM BRIDGE
LOADING H 10 AND H 15
SPANS 9 TO 29 FEET

DESIGNER	B.M.G. CHECKER	TRACER

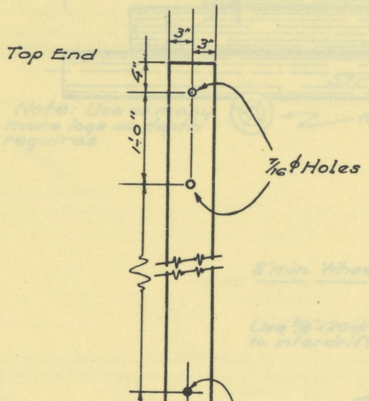
APPROVED BY: REGIONAL ENGINEER DATE 2-7-36

NOTE: ADAPTED FROM WASHINGTON OFFICE DRAWING

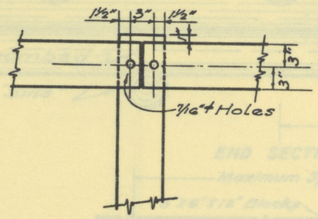
SHEET 1 OF 2 | DRAWING B-1501



DETAIL of HAND RAIL (ELEVATION)



DETAIL of RAIL POST



DETAIL of HAND RAIL JOINT
Drill Post to Suit.

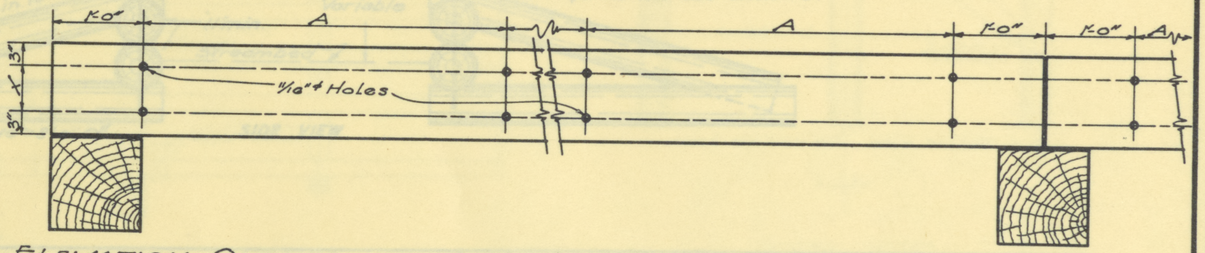
Stringer Depth	X
12"	6"
14"	8"
16"	10"
18"	12"

Span	A
9'-0"	4'-0"
11'-0"	5'-0"
13'-0"	6'-0"
15'-0"	4'-8"
17'-0"	5'-4"
21'-0"	5'-0"
25'-0"	6'-0"
29'-0"	5'-7"

NOTE

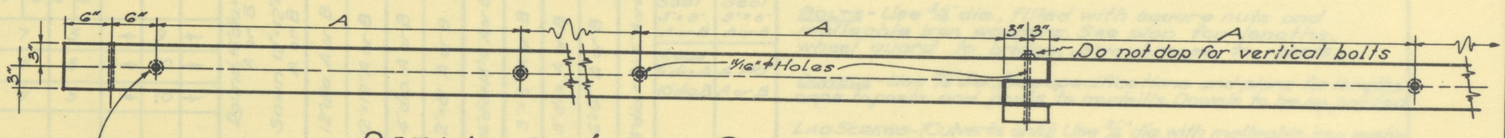
All Timber Grading, Framing, Boring, & Preservative Treatment to be in Accordance with U.S. Forest Service Specifications for Lumber, Timber, & Piles.

See Drawing B-1501 for Design of Bridge.

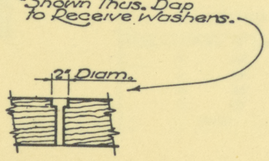


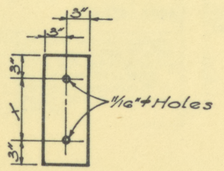
ELEVATION OUTSIDE STRINGER. SINGLE SPAN

ELEVATION OUTSIDE STRINGER JOINT, MULTIPLE SPAN.

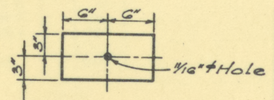


DETAIL of WHEEL GUARD (ELEVATION)





RAIL POST SPACER BLOCK (ELEVATION)



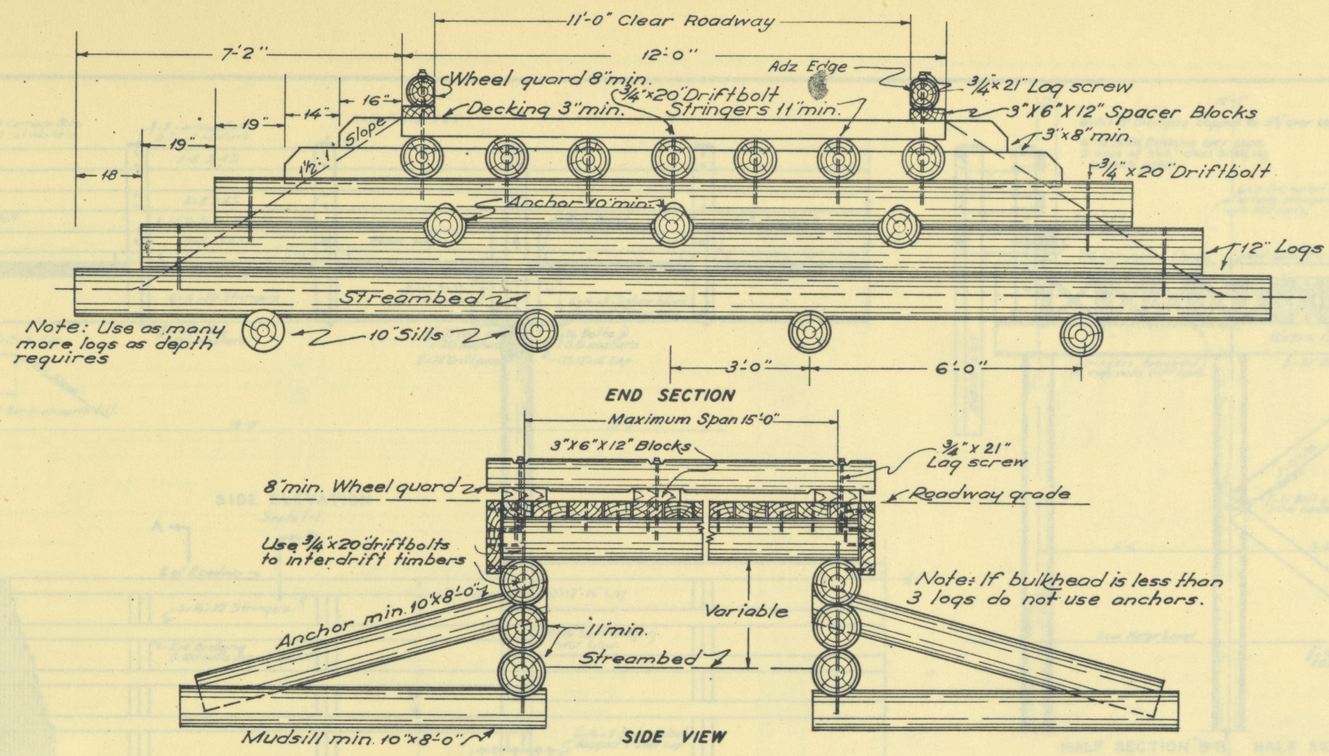
WHEEL GUARD SPACER BLOCK (PLAN)

Rev. 1-36 P.W.W.

U. S. DEPT. OF AGRICULTURE
FOREST SERVICE
REGION EIGHT

DETAILS FOR BRIDGE FABRICATION

DRAWN BY J.C.W. DATE 7/17/35 DRAWING NUMBER
APPROVED BY O.P.K. DATE 7/18/35 B-1502



SCHEDULE OF MINIMUM REQUIREMENTS FOR H-10 LOADING

Span	Stringers: Length	Stringers: Round Diameters A 10"	B 11"	A 11"	B 12"	A 12"	B 13"	Stringers: Sawn A or B 6"x12"	6"x10"	8"x8"	Caps: Round 16" dia. x 12'-0" A or B	Caps: Sawn 12"x12"x12'-0" A or B	Posts: Rnd. 12" dia. A or B	Posts: Swn. 12"x12" A or B	Sway Braces: Rnd. 4" dia. A or B	Sway Braces: Swn. 2"x8" A or B	Mudsill: 16" dia. x 14'-0" A or B	Decking: 3"x8" A or B	Wheel Guard: Rnd. 8" dia. A or B	Wheel Guard: Swn. 6"x6" A or B	Billets: 8" dia. x 2'-6" A or B	Bulkhead (See plan for length timbers): Round	Bulkhead: Sawn
11ft.	12ft.	9		7		5		←	9	→													
13ft.	14ft.	9		7		5		←	10	→													
15ft.	16ft.	9		7		5		←	10	→													
											Round 16" dia. x 12'-0" A or B	Sawn 12"x12"x12'-0" A or B	12" dia. A or B	12"x12" A or B	4" dia. A or B	2"x8" A or B	16" dia. x 14'-0" A or B	3"x8" A or B	8" dia. A or B	6"x6" A or B	8" dia. x 2'-6" A or B	Seal 3"x8" A or B Logs 9" dia. A 10" dia. B	Seal 3"x8" A or B 4"x10" A or B

HARDWARE REQUIREMENTS

DRIFT BOLTS – Use 3/4" dia. (see specifications and plans for lengths) stringers to caps, bulkhead logs to each other. Predrill as per specifications with 11/16" auger. Drift bolts to be square pointed.

BOLTS – Use 3/4" dia., filled with square nuts and malleable iron washers. See plan for lengths, wheel guard to bridge, , sway braces to posts.

DOWELS – Use 3/4" dia., (See specifications and plans for lengths caps to posts and posts to mudsills. Dowels to be sq. pointed

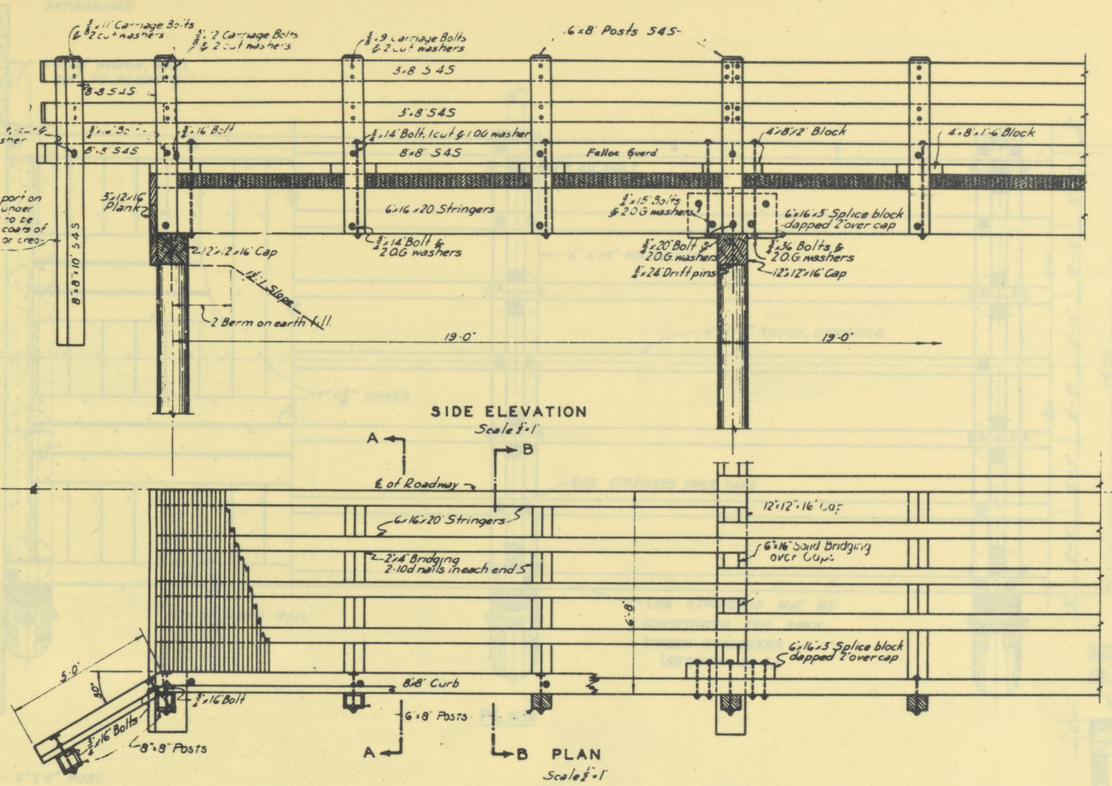
LAG SCREWS – (Culverts only) Use 3/4" dia. with malleable iron washer.

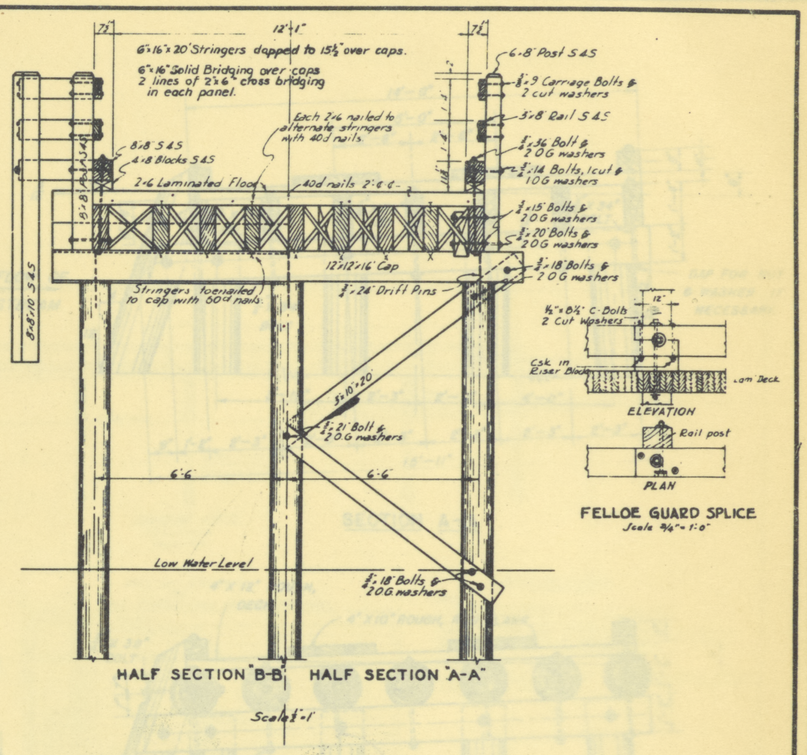
U.S. DEPT. OF AGRICULTURE
FOREST SERVICE
REGION EIGHT

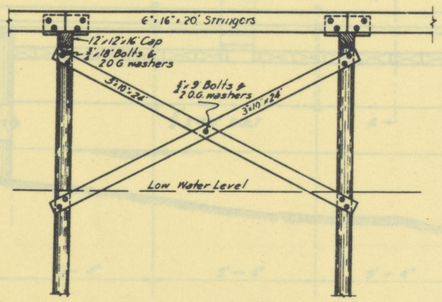
ROUND OR SAWN
TIMBER BRIDGE
USING SMALL TIMBER & CLOSED ABUTMENTS

DRAWN BY W.W.M. DATE ____ DRAWING NO.
APPROVED BY [illegible] DATE 12-7-35 B-3103
TRACED BY C.W.A. DATE ____

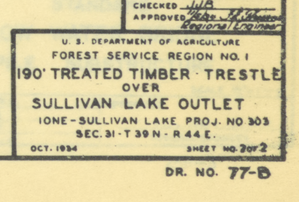
REV. 1-22-36 P.W.W.
SHEET 3 OF 3







PART SIDE ELEVATION
TOWER BRACING
Scale 1/4"=1'



FELLOE GUARD SPLICE
Scale 3/4"=1'-0"

BILL OF LUMBER

Description	Grade	Finish	Size	Length	No.	F. B. M. Treated	F. B. M. Untreated
Rail	Select Struct.	S4S	3"x8"	20'	42		1680
Posts	" "	"	8"x8"	12'	6		384
"	" "	"	6"x8"	18'	20		1440
Curb	№1 Dimen.	"	8"x8"	20'	21	2,240	
Riser Blocks	" "	"	4"x8"	1'-6"	44	176	
" "	" "	"	4"x8"	2'-0"	18	96	
Flooring	Select Struct.	S1E	2"x6"	13'-4"	1160	16,240	
Plank	№1 Dimen.	Rough	3"x12"	16'	6	288	
Bridging	" "	"	2"x4"	14'	40	374	
Braces	" "	"	3"x10"	20'	18	900	
"	" "	"	3"x10"	24'	20	1,200	
Caps	Select Struct.	"	12"x12"	16'	11	2,112	
Stringers & Bridging	Sel. Struct.	"	6"x16"	20'	92	14,720	
Splice Blocks	№1 Dimen.	"	6"x16"	3'	18	432	
Totals						38,778	3,504

Piles — 3 Piles	12' long	= 36 Lin Ft.	All piles up to 40' in length shall be not less than 12" in dia. at the butt and 5" at the tip. All piles over 40' in length shall be not less than 14" in dia at the butt and 7" at the tip.
9 "	24' "	= 216 " "	
6 "	34' "	= 204 " "	
6 "	40' "	= 240 " "	
9 "	50' "	= 450 " "	
Total		= 1146 " "	

BILL OF HARDWARE

Description	Size	No.	Weight
Carriage Bolts	⅜"x9"	304	87 #
" "	⅜"x11"	32	11
" "	⅜"x12"	16	6
Machine Bolts	⅜"x9"	10	14
" "	⅜"x14"	102	209
" "	⅜"x15"	72	156
" "	⅜"x16"	12	27
" "	⅜"x18"	136	345
" "	⅜"x20"	13	50
" "	⅜"x21"	17	49
" "	⅜"x36"	80	397
Drift Pins	⅝"x24"	33	99
Cut Washers for	⅝" bolts	352	5
" " "	½" "	352	14
" " "	⅜" "	70	8
OG " "	⅜" "	832	1040
Nails	10 d.		15
"	40 d.		800
"	60 d.		100
Total Weight			3432

GENERAL NOTES

All lumber shall be Coast Region Douglas Fir and shall be graded in accordance with the Grading Rules of the West Coast Lumbermen's Ass'n. dated July 1, 1934.

All lumber, except rail and rail posts, shall be pressure treated, by the empty cell process, to contain not less than the following amounts of creosote oil per cu. ft.:—

All lumber less than 5 inches in thickness — 10 lbs.
" " 5 inches or more " " — 8 "

Tops of piles, bolt holes, and timber surfaces cut after treatment, shall be given 2 coats of hot tar or creosote.

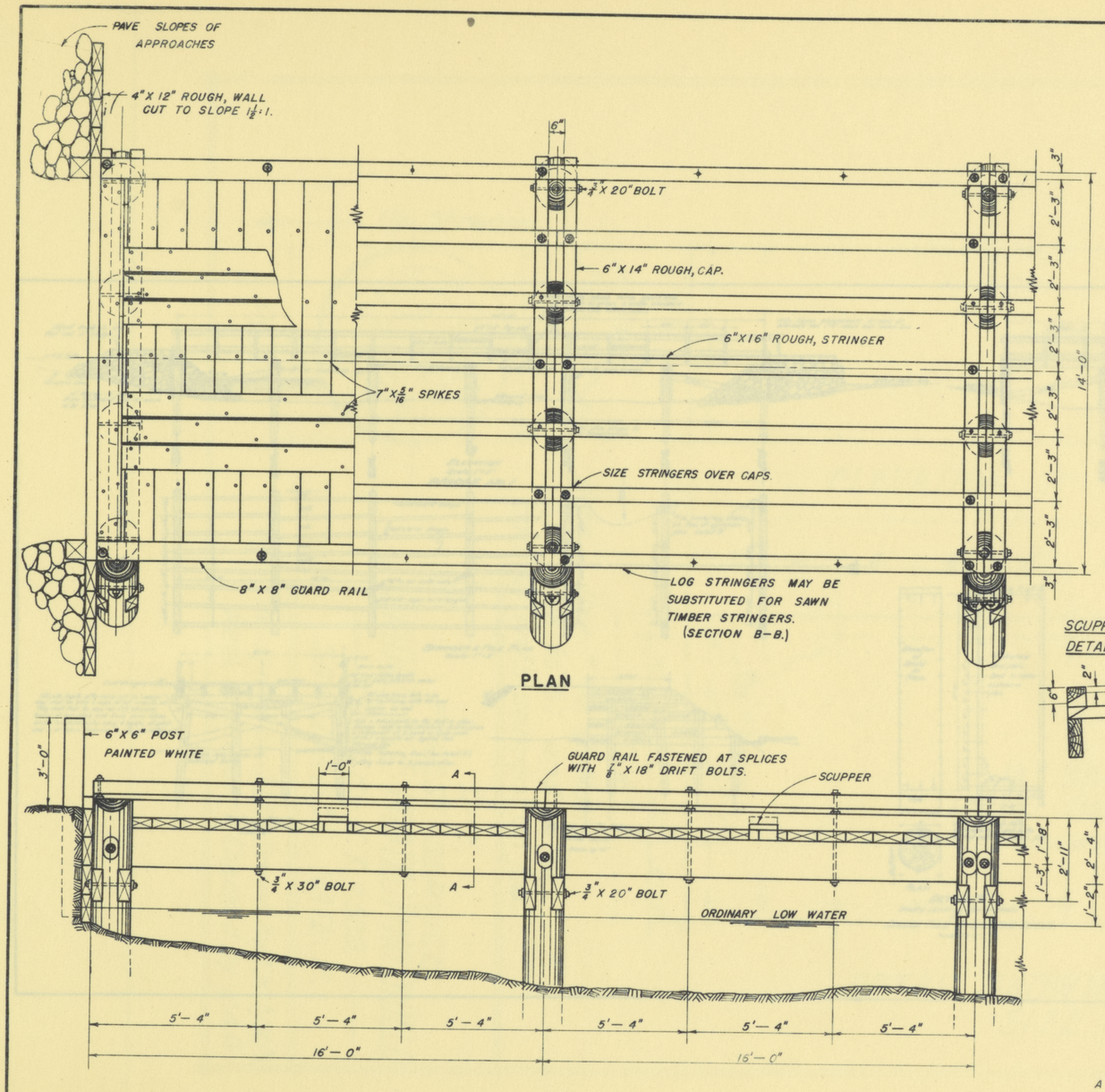
Rail Posts, below top of curb, shall be given 2 coats of hot creosote. Rail and rail posts, above top of curb, shall be given 2 coats of aluminum paint.

All piles shall be driven to a bearing capacity of 15 tons.

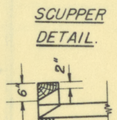
DESIGNED A.L.K.
TRACED L.H.Carroll
CHECKED J.W.B.
APPROVED Peter J. Peterson Regional Engineer

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
190' TREATED TIMBER TRESTLE
OVER
SULLIVAN LAKE OUTLET
IONE-SULLIVAN LAKE PROJ. NO 303
SEC. 31 - T 39 N - R 44 E.
OCT. 1934 SHEET NO. 2 OF 2

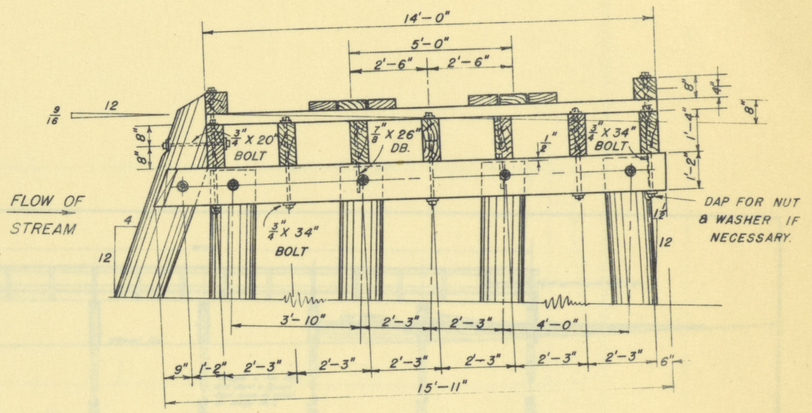
DR. NO. 77-B



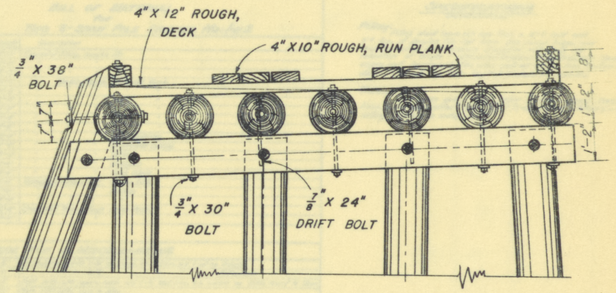
PLAN



UPSTREAM ELEVATION



SECTION A-A



SECTION B-B

RUN PLANK	4"X10" ROUGH	NO. 1 COMMON
DECK	4"X12" ROUGH	NO. 1 COMMON
GUARD RAIL	8"X 8" ROUGH	NO. 1 COMMON
CAPS	6"X 14" ROUGH	NO. 1 COMMON
STRINGERS (SAWN)	6"X 16" ROUGH	NO. 1 COM. D.F.
STRINGERS (LOG)	14" MIN. DIA.	DOUGLAS FIR
BULKHEAD	4"X 12" ROUGH	NO. 1 COMMON
PILING	16" MIN. BUTTS	

QUANTITIES:—

2,515 F.B.M. SAWN LUMBER PER PANEL.
125 LBS. HARDWARE PER PANEL.

H-15 LOADING

NOTES

DECK TO BE LAID WITH ½" SPACE BETWEEN PLANKS.
CUT ONE SCUPPER IN EACH PANEL.
DAP ALL PILING TO RECEIVE CAPS LEAVING A MINIMUM CORE OF 6".
ALL HOLES BORED 13/16"
10'-0" MINIMUM PENETRATION OF ALL PILING.
PILING TO BE EITHER DOUGLAS FIR OR CEDAR.

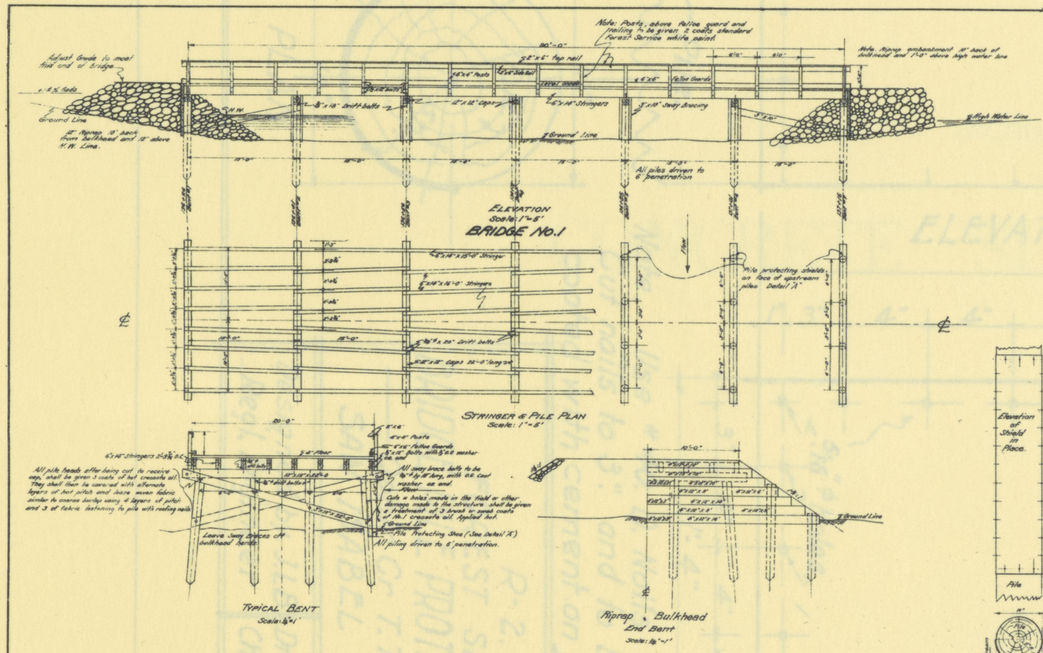
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

STANDARD
LOW WATER BRIDGE
PILE SUBSTRUCTURE

DEC. 19, 1935 SCALE ½"=1'-0"

DESIGNED BY R.W.L.	APPROVED
DRAWN BY R.W.S.	
TRACED BY R.W.S.	
CHECKED BY	REGIONAL ENGINEER

2-P-3

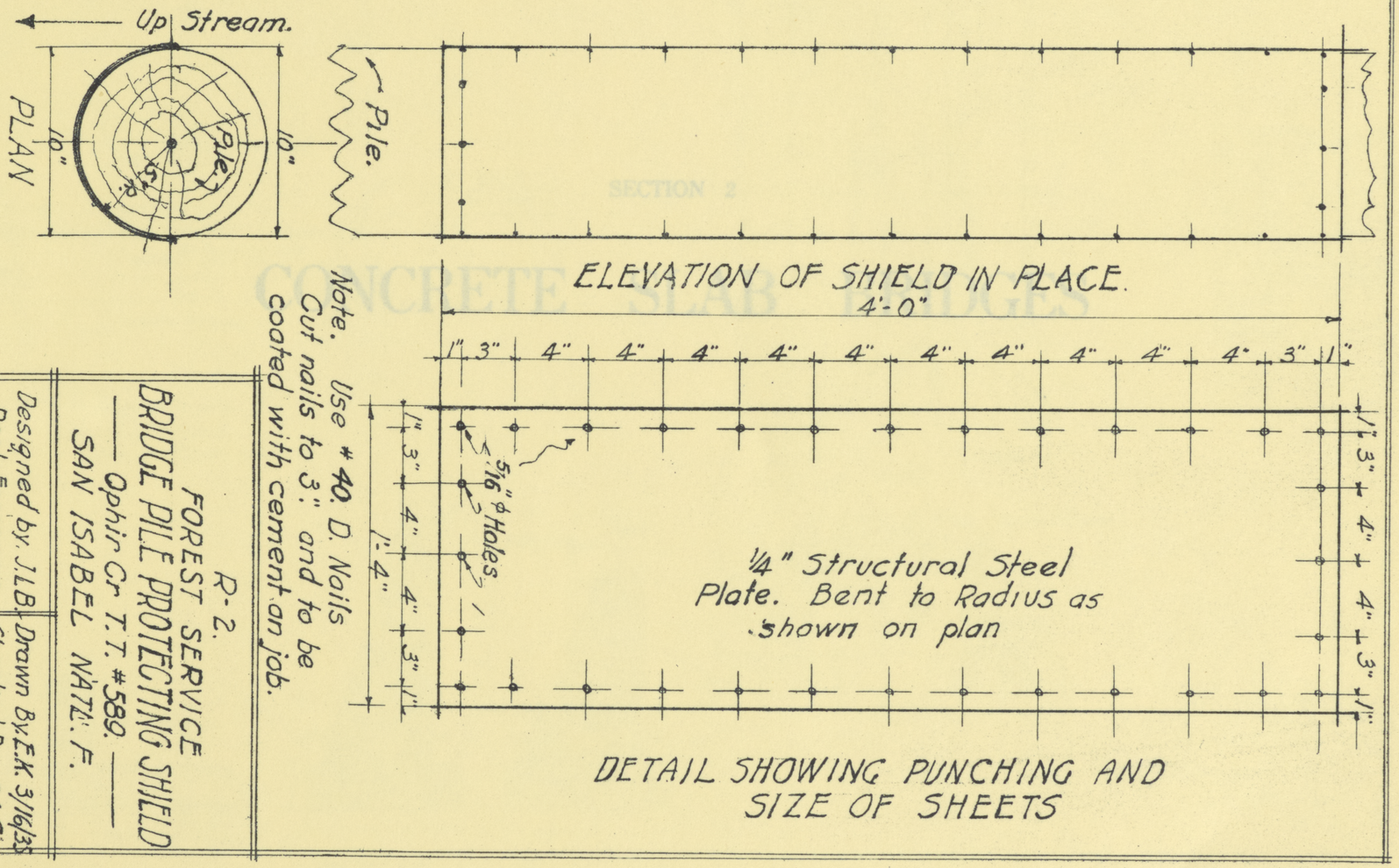


BILL OF MATERIAL
For
TWO 6-SPAN PILE BRIDGES No.1 & 2

No. Pcs.	Size	Length	Description
8		15'-6"	Creosoted Piling, Douglas Fir.
18		25'-0"	" " " "
60		21'-0"	" " " "
4	4"x12"	16'-0"	Timber, Rough. Bulkhead Plank
18	"	25'-0"	" " " "
12	"	21'-0"	" " " "
6	" "	15'-0"	" " " "
8	" "	14'-0"	" " " "
10	"	13'-0"	" " " "
20	3"x8"	22'-0"	" " " Sway Bracing
12	3"x8"	18'-0"	" " " Longitudinal Bracing
14	8"x12"	22'-0"	" " " Caps
24	6"x12"	16'-0"	" " " Stringers
88	4"x12"	16'-0"	" " " Deck Plank
16	4"x6"	16'-0"	Untreated Timber. 2-3. Railing Posts.
48	2"x8"	12'-0"	" " " Railing.
12	" "	14'-0"	" " " "
20	6"x8"	16'-0"	Creosoted Timber, Rough Pelton Guard
4	6"x8"	12'-0"	" " " "

BRIDGE IRON & MISCELLANEOUS

22	3/4"	18"	Std. bridge bolts with 2-3/4" Cast iron, SQ. washers and 1 nut ea. Bracing
152	3/4"	12"	" " " "



DETAIL SHOWING PUNCHING AND SIZE OF SHEETS

Note. Use #40. D. Nails
Cut nails to 3". and to be
coated with cement an job.

R-2.

FOREST SERVICE

BRIDGE PILE PROTECTING SHIELD

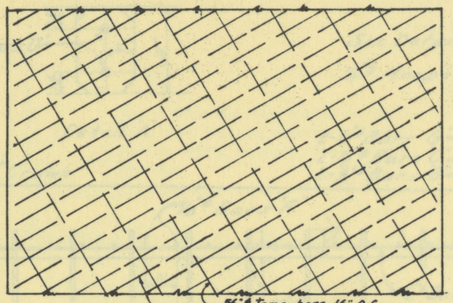
—— Ophir Cr. T. T. #589. ——

SAN ISABEL NAT'L. F.

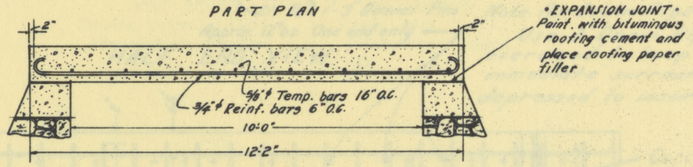
Designed by J.L.B.	Drawn By E.K. 3/16/33
Regl. Engineer	Checked By C.A.G.

SECTION 2

CONCRETE SLAB BRIDGES



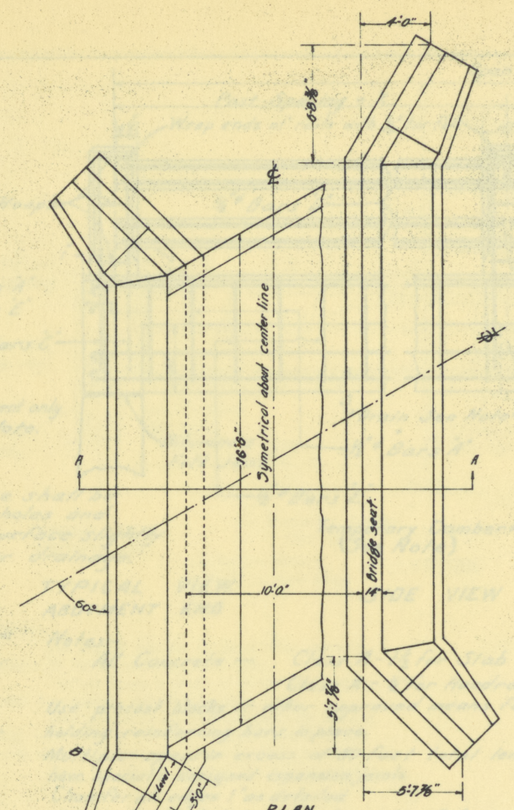
PART PLAN



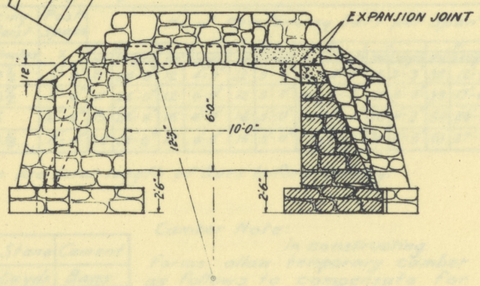
"EXPANSION JOINT" Paint with bituminous roofing cement and place roofing paper filler

SECTION ON LINE A-A.

DETAIL OF ¾"ϕ REINF. BARS.



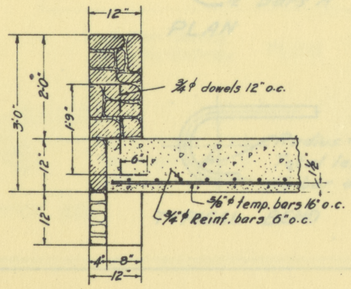
PLAN



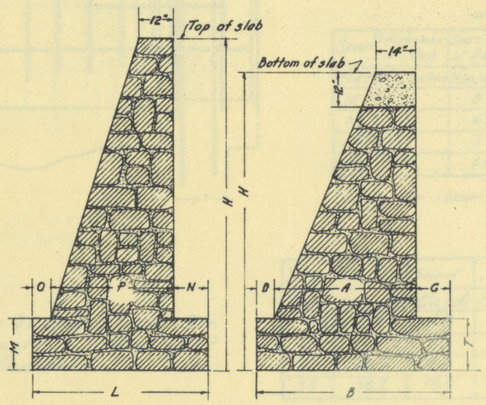
SIDE ELEVATION

WING WALL DIMENSIONS					
H.	L	M	N	O	P
4'0"	2'0"	12"	6"	6"	1'6"
6'0"	3'0"	12"	6"	6"	2'0"
8'0"	4'1"	16"	10"	6"	2'9"
10'0"	5'3"	20"	14"	7"	3'6"
12'0"	6'4"	2'0"	16"	8"	4'4"
14'0"	7'6"	2'6"	18"	10"	5'2"
16'0"	8'8"	3'0"	20"	12"	6'0"

ABUTMENT DIMENSIONS					
H	B	T	C	D	A
4'0"	3'3"	12"	6"	6"	2'3"
6'0"	4'3"	12"	9"	6"	3'0"
8'0"	5'3"	16"	12"	6"	3'9"
10'0"	6'2"	20"	15"	8"	4'3"
12'0"	7'3"	2'0"	15"	10"	5'2"
14'0"	8'4"	2'6"	18"	10"	6'0"
16'0"	9'6"	3'0"	18"	12"	7'0"



DETAIL OF CURB.



SECTION B-B. THRU. WING WALL

ABUTMENT SECTION

Approved by ..... A. R. F. Date Jan 20 1936
In charge of Engineering

Approved by John H. Adams Asst. R. F. Date Jan. 20. 1936.
In charge of Lands

Designed by R.L.H.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 3

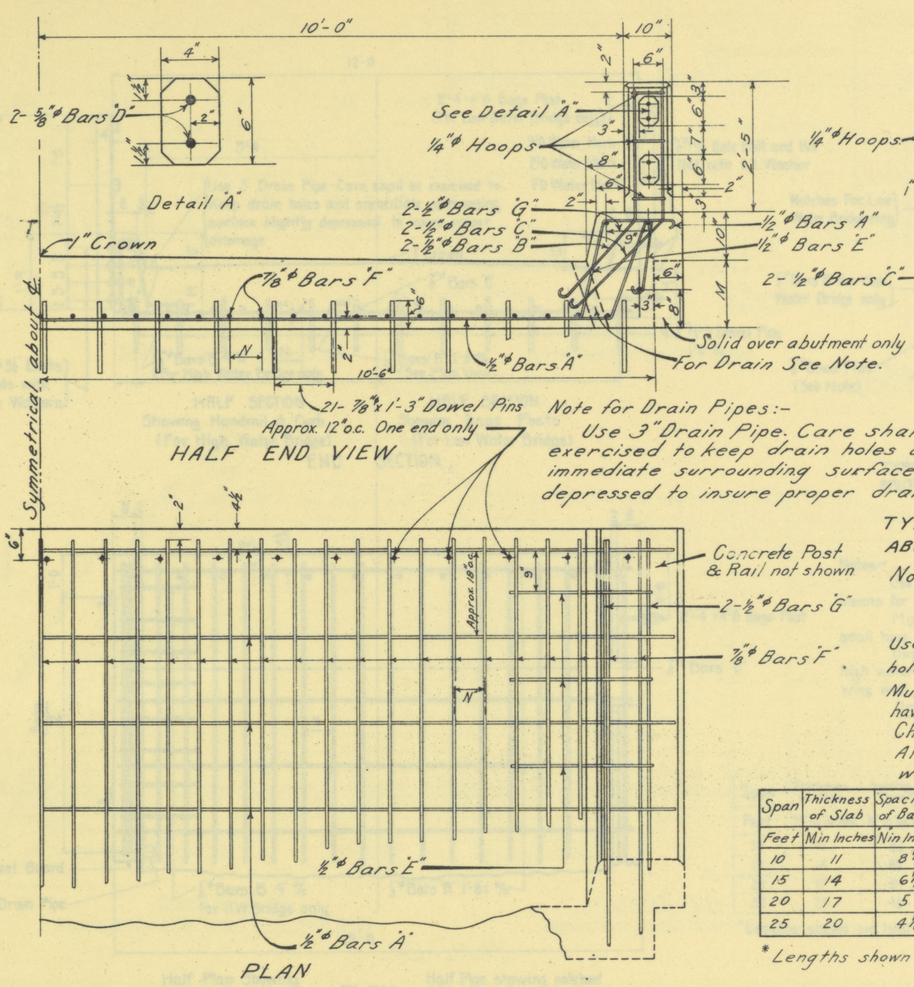
BRIDGE.

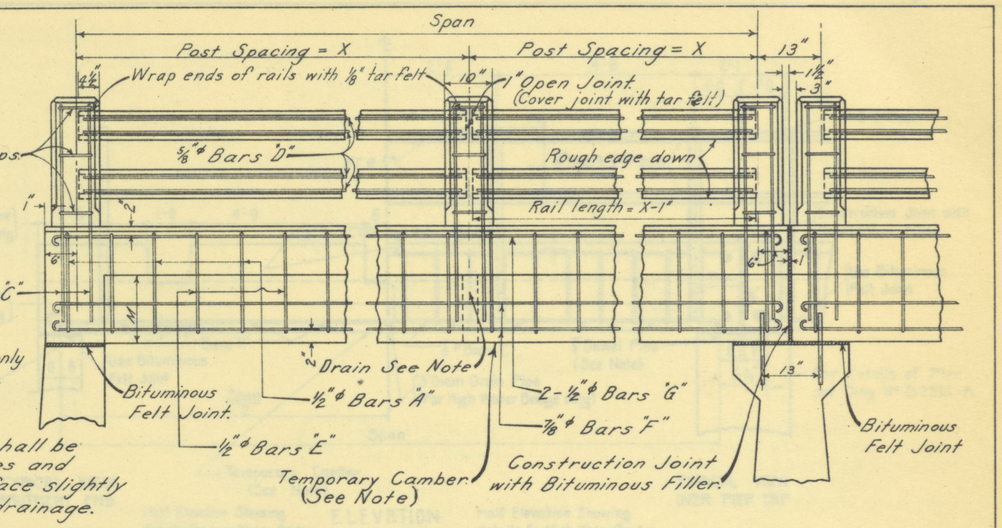
REINFORCED CONCRETE SLAB
RUBBLE MASONRY ABUTMENT
10 FT. SPAN

A. S. Wilson.

ER 10

DWG. NO. B-901





TYPICAL VIEW ABUTMENT END

TYPICAL VIEW OVER PIER CAP

Notes:-

All Concrete — Class A - 1½ for Slab and Posts.
Class A - ½ for Handrail

Use precast blocks or other approved means for holding reinforcing bars in place.

Multiple spans in excess of 80 feet total length, shall have specially designed expansion joints.

Chamfer all edges 1" as detailed.

All handrails shall be precast on edge; Set in post forms with rough edge down.

Specifications

Reinforcing Bars - F.S.Q.Q-B-71. Type B-Grade 1 (Deformed Structural) (Class A) (Open Hearth Steel)
Hoops - Type A (Plain)
Concrete — See Notes

Span	Thickness of Slab	Spacing of Bars F	Post Space	No. of Reinforcing Bars per Span*																1/4"ϕ Hoops		Dowel Pins	Wt of Reinforcing Bars and Dowel Pins.
				A		B		C		D		E		F		G							
Feet	Min Inches	Min Inches	X	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Pounds
10	11	8½	5'-0"	8	24'-6"	12	4'-9"	12	5'-0"	16	4'-9"	14	5'-3"	30	12'-6"	4	12'-6"	18	2'-8"	21	1250
15	14	6½	7'-6"	11	25'-0"	12	4'-9"	12	5'-0"	16	7'-3"	20	5'-9"	39	17'-6"	4	17'-6"	18	2'-8"	21	2040
20	17	5	6'-8"	15	25'-6"	16	4'-9"	16	5'-0"	24	6'-5"	28	6'-3"	50	22'-6"	4	22'-6"	24	2'-8"	21	3160
25	20	4⅛	8'-4"	18	26'-0"	16	4'-9"	16	5'-0"	24	8'-1"	34	6'-9"	61	27'-6"	4	27'-6"	24	2'-8"	21	4470

*Lengths shown are total length of Bars before bending.

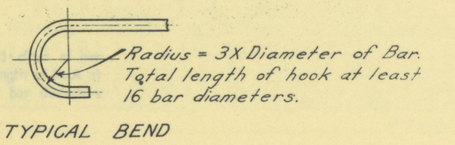
Design Data

H-15 Loading
f_s - 16,000 #/in²
f_c - 800 #/in² n-10
15 #/sq ft allowance for surfacing.

Span	Concrete	Sand	Stone	Cement
Feet	Cu yds.	Cu yds	Cu yds	Bags
10	9.9	4.8	8.4	63
15	17.1	8.3	14.4	108
20	26.5	12.8	22.3	168
25	38.2	18.4	32.1	242

Camber Note:
In constructing forms allow temporary camber as follows to compensate for shrinkage.

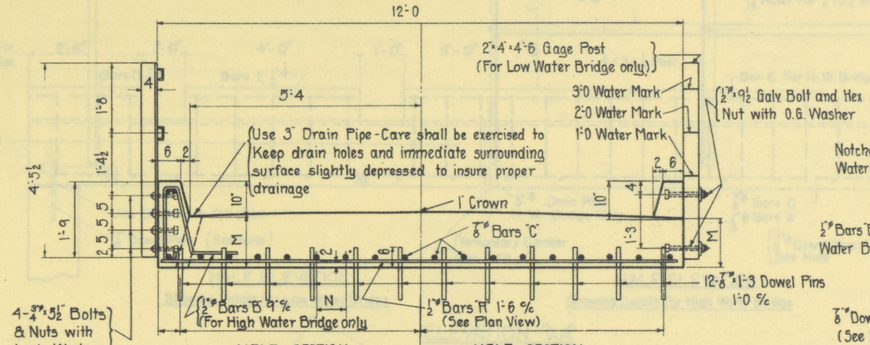
Span	Camber at center of Span
10'	¼"
15'	⅜"
20'	½"
25'	⅝"

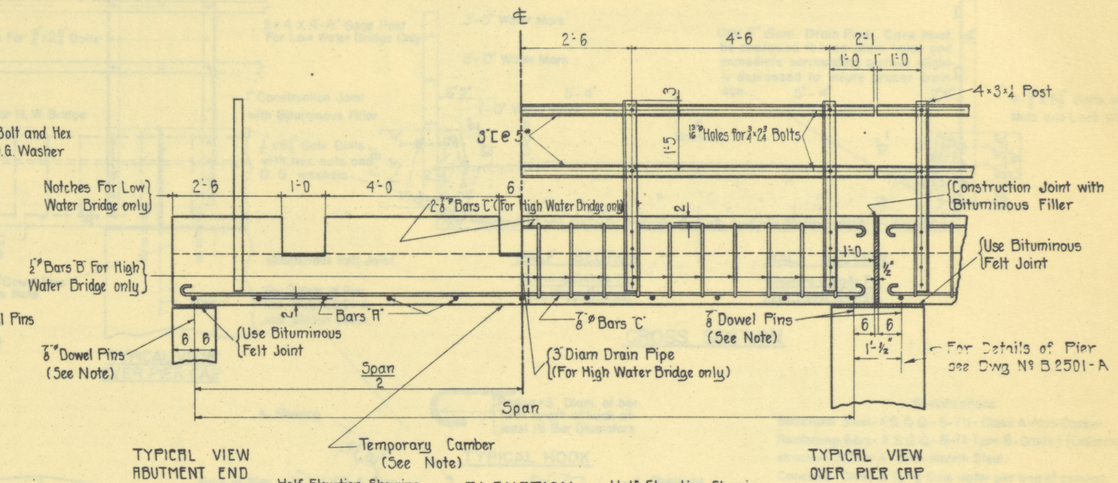


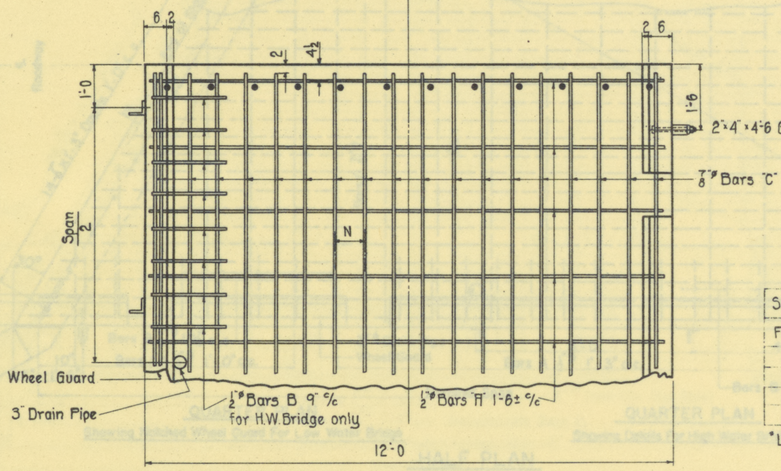
TYPICAL BEND

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-7
REINFORCED CONCRETE BRIDGES
19-FT. ROADWAY
10-FT. TO 25 FT. SPANS

DESIGNED & CHECKED D.B & R.E.P.
DRAWN W.I.D. TRACED M.E.G.
APPROVED [signature] Reg. Engr. DATE March 1933.
Revised Specifications Feb. 3 1936







Notes–

Use precast concrete blocks or other approved means for holding reinforcing bars in place

Multiple spans in excess of 80 feet total length shall have specially designed expansion Joints

Omit dowels on one abutment for bridge clearing high water and for low-water bridges if abutment and wing wall design prevents horizontal displacement

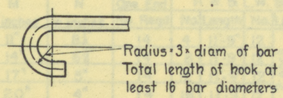
Omit bars B and 4 bars C for low-water bridge

Specifications
1- Structural Steel F.S.90-S-711 Class A- Non-Copper
2- Reinforcing Bars FS.90-B-71 Type B-Grade 1 (Deformed Structural) Class A (Open Hearth Steel)
3-Concrete-Class A-1½

Design Data
H-15 Loading 15#/sq.ft allowance
f_s = 16000#/in²
f_c = 800#/in²

Span	Thickness of Slab	Spacing of Bars C	Reinforcing Bars for Slab *						Reinforcing Bars * for curb			Rail Posts		3"@5" C-Rail & Bolts for Posts & Rails				Bolts and Washers for Notched Wheel Guard and Gage Poles			⅞" Dowel Pins 1'-3" lg One End	
			Bars "A"		Bars "C"				Bars "B"										O.G. Washer			
Feet	M in inches	N in inches	Nº	Length	Nº	Length	Weight		Nº	Length	Weight	Pair	Weight	Ft of Rail	¾"x5½" lg	¾"x2¾" lg	Weight	½"x9½" lg	½" hole	Weight	Nº	Weight
10	11	8½	7	11'-9	22	12'-6	617#		26	4'-6	78#	3	155#	4@11'-0	26	14	260#	4	4	5#	12	31#
15	14	6½	11	11'-9	27	17'-6	1052#		42	5'-0	140#	4	207#	4@16'-0	35	18	373#	4	4	5#	12	31#
20	17	5	14	11'-9	33	22'-6	1628#		54	5'-6	198#	5	259#	4@21'-0	44	22	486#	4	4	5#	12	31#
25	20	4½	17	11'-9	39	27'-6	2326#		66	6'-0	273#	6	310#	4@26'-0	53	27	600#	4	4	5#	12	31#

*Lengths shown are total length of bars before bending



TYPICAL BEND

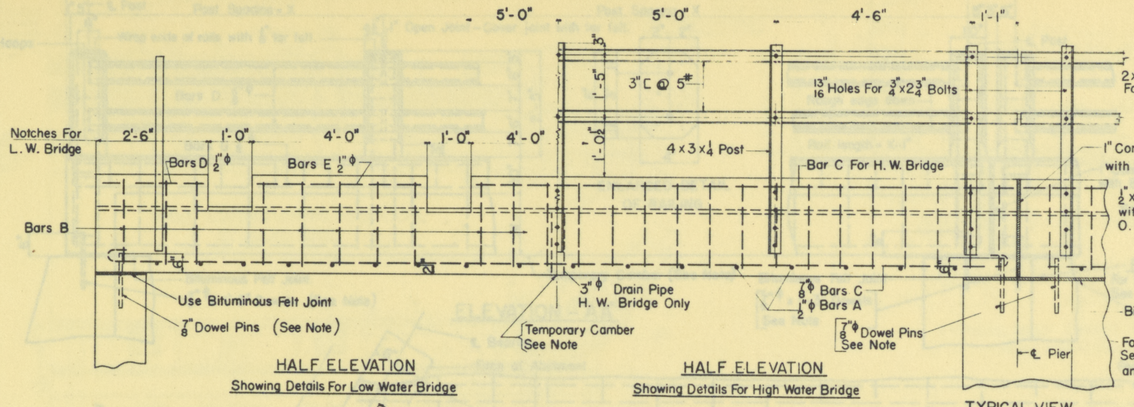
Span	Concrete		Sand		Stone		Cement	
Feet	Cu yds Slab	Curb	Cu yds Slab	Curb	Cu yds Slab	Curb	Bags Slab	Curb
10	4.7	0.4	2.4	0.2	4.0	0.4	32	3
15	8.6	0.6	4.4	0.3	7.1	0.5	59	4
20	13.6	0.8	6.8	0.4	11.1	0.6	92	5
25	19.7	0.9	10.0	0.5	16.2	0.7	135	6

Camber Note:–

In constructing forms allow temporary camber as follows to compensate for Deflection

Span	Camber at center of Span
10'	¼"
15'	⅜"
20'	½"
25'	⅝"

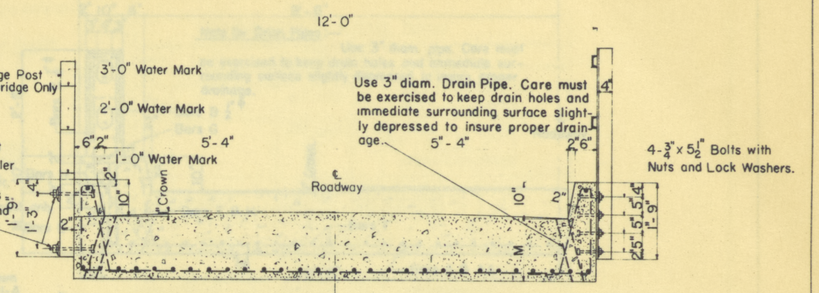
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-7
REINFORCED CONCRETE BRIDGES
11-FT ROADWAY
10-FT TO 25FT SPANS
DESIGNED & CHECKED R.E.P. & D.B.
DRAWN M.E.G. TRACED M.E.G.
APPROVED _____ DATE Feb. 1933
Regional Engineer
Revised:- June 1934 JD
Revised:- Sept. 1934 JD



HALF ELEVATION
Showing Details For Low Water Bridge

HALF ELEVATION
Showing Details For High Water Bridge

TYPICAL VIEW OVER PIER CAP

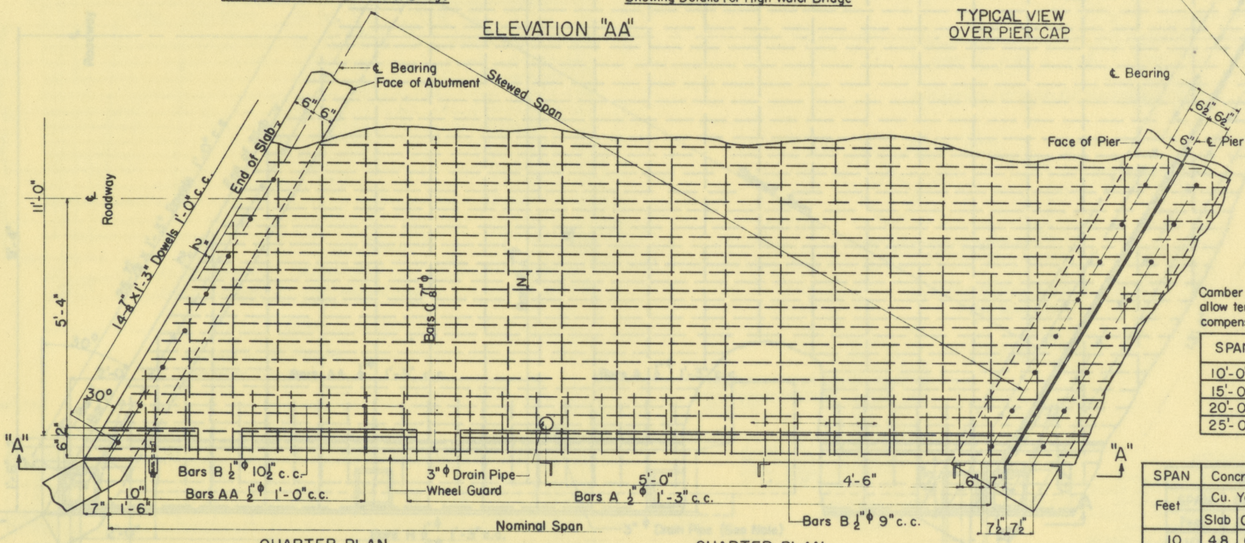


HALF SECTION
Showing Details For Low Water Bridge

HALF SECTION
Showing Details For High Water Bridge

CROSS SECTION

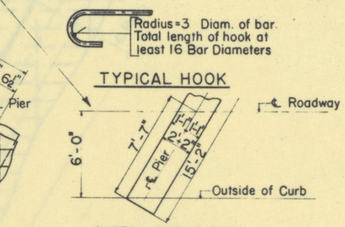
ELEVATION "AA"



QUARTER PLAN
Showing Notched Wheel Guard For Low Water Bridge

QUARTER PLAN
Showing Details For High Water Bridge

HALF PLAN



SKETCH OF PIER TOP

Camber Note:– In constructing forms allow temporary camber as follows to compensate for deflection.

SPAN	Camber at Center of Span
10'-0"	¼"
15'-0"	½"
20'-0"	½"
25'-0"	⅝"

Specifications
Structural Steel- F.S.Q.Q.-S-711- Class A-Non-Copper.
Reinforcing Bars- F.S.Q.Q.-B-71-Type B-Grade 1 (Deformed structural) Class A-Open Hearth Steel.
Concrete- Class A 1½-6 Gals water per bag of cement.

Design Data
H-15 Loading. 15#/Sq. ft allowance.
f_s=16000#/Sq. in.
f_c=800#/Sq. in.

Notes:–
Use precast concrete blocks or other approved means for holding reinforcing bars in place.
Multiple spans in excess of 80 feet total length shall have specially designed expansion joints.
Omit dowels on one end of each span for bridge clearing high water and for low water bridges if abutment and wing wall design prevents horizontal displacement.

Feet	Concrete		Sand		Stone		Cement	
	Cu. Yds		Cu. Yds		Cu. Yds		Bags	
	Slab	Curb	Slab	Curb	Slab	Curb	Slab	Curb
10	4.8	0.4	2.4	0.2	3.8	0.4	32	3
15	8.7	0.6	4.4	0.3	7.1	0.5	59	4
20	13.8	0.8	6.9	0.4	11.1	0.6	92	5
25	20.0	1.0	10.0	0.5	16.2	0.7	135	6

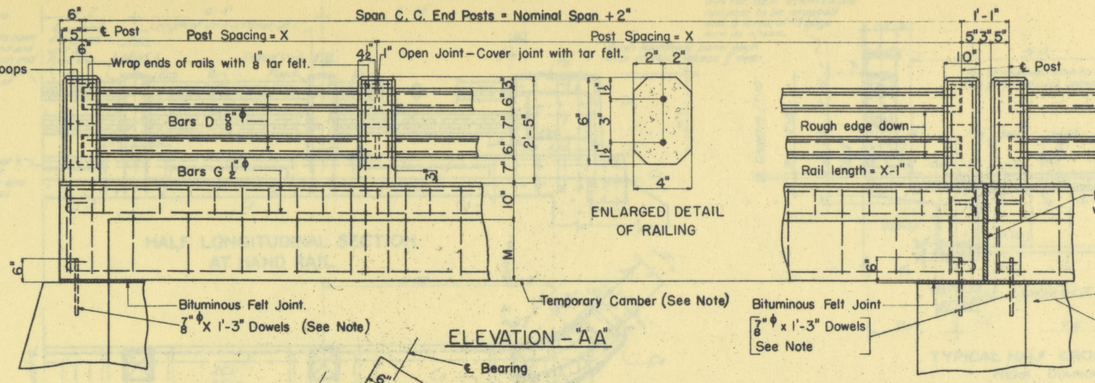
SPAN Nominal C. to C. Bearings	SPAN Skewed C. to C. Bearings	Thickness of Slab M in inches	Spacing of Bars C N in inches	REINFORCING BARS * 7"x1'-3" ⅝ Dowels One End No. Reqd	Bars A H.W. & L.W. Bridge No.	Bars A Length	Bars AA L.W. Bridge No.	Bars AA Length	Bars B H.W. Bridge No.	Bars B Length	Bars B L.W. Bridge No.	Bars B Length	Bars C H.W. Bridge No.	Bars C Length	Bars C L.W. Bridge No.	Bars C Length	Bars D L.W. Bridge No.	Bars D Length	Bars E L.W. Bridge No.	Bars E Length	Weight in Lbs H.W. Bridge	Weight in Lbs L.W. Bridge
10'-0"	8'-8"	11"	8¼"	14	4	11'-9"	12	2 each 1'-9" to 10'-6" at 1'-9" Intervals	30	4'-6"	22	4'-6"	20	12'-7"	18	12'-7"	4	2'-2"	2	3'-8"	730	670
15'-0"	13-0"	14"	6⅜"	14	8	11'-9"	12		42	5'-0"	32	5'-0"	25	17'-7"	23	17'-7"	4	2'-2"	4	3'-8"	1200	1110
20'-0"	17'-4"	17"	5"	14	12	11'-9"	12		56	5'-6"	42	5'-6"	31	22'-7"	29	22'-7"	4	2'-2"	6	3'-8"	1830	1700
25'-0"	21'-7¾"	20"	4"	14	16	11'-9"	12		70	6'-0"	52	6'-0"	38	27'-7"	36	27'-7"	4	2'-2"	8	3'-8"	2650	2500

STRUCTURAL STEEL 3" ⌀ 5# C Railing	Railing Posts H.W. Bridge No.	Railing Posts H.W. Bridge Length	Railing Posts L.W. Bridge No.	Railing Posts L.W. Bridge Length	3" x 5½" ½ Bolts No. Reqd	3" x 2¾" ¾ Bolts No. Reqd	1" x 9½" ½ Bolts L.W. Bridge No. Reqd	1" O. G. ½ Washers L.W. Bridge No. Reqd	Weight in Lbs H.W. Bridge Ls & Cs	Weight in Lbs H.W. Bridge Bolts	Weight in Lbs L.W. Bridge Bolts
4	11'-2"	6	4'-5½"	26	14	4	4	375	40	5
4	16'-2"	8	4'-5½"	35	18	4	4	530	50	5
4	21'-2"	10	4'-5½"	44	22	4	4	680	60	5
4	26'-2"	12	4'-5½"	53	27	4	4	830	75	5

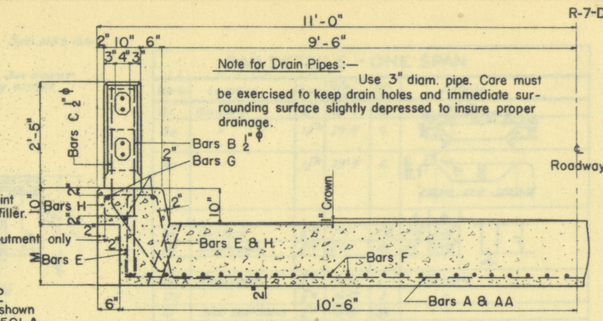
* Lengths shown are total length of bars before bending.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REINFORCED CONCRETE SLAB BRIDGES
11'-0" ROADWAY– 30° SKEW
NOMINAL SPANS– 10'-0" TO 25'-0"
SKEWED SPANS– 8'-8" TO 21'-7¾"

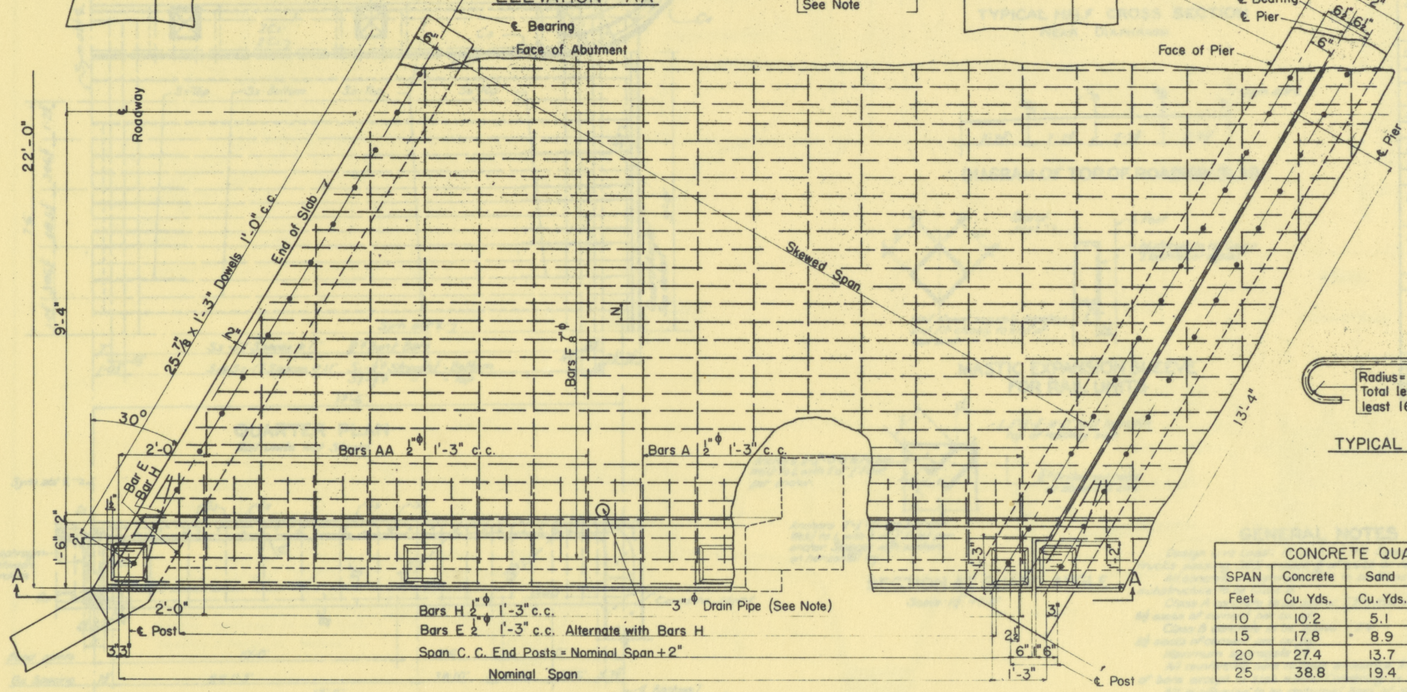
DESIGNED MODIFICATION OF DWG B-2301 DRAWN C. C. J.
CHECKED C. A. T. TRACED C. C. J.
RECOMMENDED FOR APPROVAL E. E. W. DATE DECEMBER 1935
APPROVED Jos. Scott REGIONAL ENGINEER



ELEVATION – "AA"



HALF SECTION



HALF PLAN
Handrail not shown.

Radius = 3 x Dia. of bar.
Total length of hook to be at least 16 Bar Diameters.

TYPICAL HOOK

Specifications

Reinforcing Bars – F.S.Q.Q.-B-71-Type B-Grade I (Deformed structural) Class A-Open Hearth Steel.
Hoops – F.S.Q.Q.-B-71-Type A-Grade I (Plain) Class A-Open Hearth Steel.
Concrete:
Slab and posts Class A 1½-6 Gals water per bag of cement.
Handrail – Class A-½

Design Data

H-15 Loading — 15#/Sq. ft allowance for surfacing.
f_s = 16000#/Sq. in.
f_c = 800#/Sq. in. n=10

Notes:–

Use precast concrete blocks or other approved means for holding reinforcing bars in place.
Multiple spans in excess of 80 feet total length shall have specially designed expansion joints.
Chamfer edges 1" as detailed.
All handrail shall be precast on edge. Set in post forms with rough edge down.
Omit dowels at one end of each span.

SPAN		Thickness of Slab	Spacing of Bars F	Post Spacing	REINFORCING BARS*																								Weight
Nominal C. to C. Bearings	Skewed C. to C. Bearings	M in inches	N in inches	X	Bars A		Bars AA		Bars B		Bars C		Bars D		Bars E		Bars F		Bars G		Bars H		Bars K		¼" Hoops		⅞" Dowels One End		
					No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No.	Length	No. Reqd.	in Lbs.
10'-0"	8'-8"	11"	8½"	5'-1"	—	—	16	2 each 3'-6" to 18-8" 2'-2" intervals	12	4'-5"	12	4'-10"	16	4'-10"	18	5'-0"	30	12'-8"	6	11'-10"	18	5'-0"	6	1'-8"	18	2'-8"	25	1310
15'-0"	13-0"	14"	6½"	7'-7"	4	20'-8"	16		12	4'-8"	12	4'-10"	16	7'-4"	26	5'-6"	39	17'-8"	6	16-10"	26	5'-3"	6	1'-8"	18	2'-8"	25	2140
20'-0"	17'-4"	17"	5"	6'-8½"	8	20'-8"	16		16	4'-11"	16	4'-10"	24	6'-5"	34	6'-0"	51	22'-8"	6	21'-10"	34	5'-6"	8	1'-8"	24	2'-8"	25	3330
25'-0"	21'-7¾"	20"	4⅛"	8'-4¾"	12	20'-8"	16		16	5'-2"	16	4'-10"	24	8'-1"	42	6'-6"	61	27'-8"	6	26'-10"	42	5'-9"	8	1'-8"	24	2'-8"	25	4630

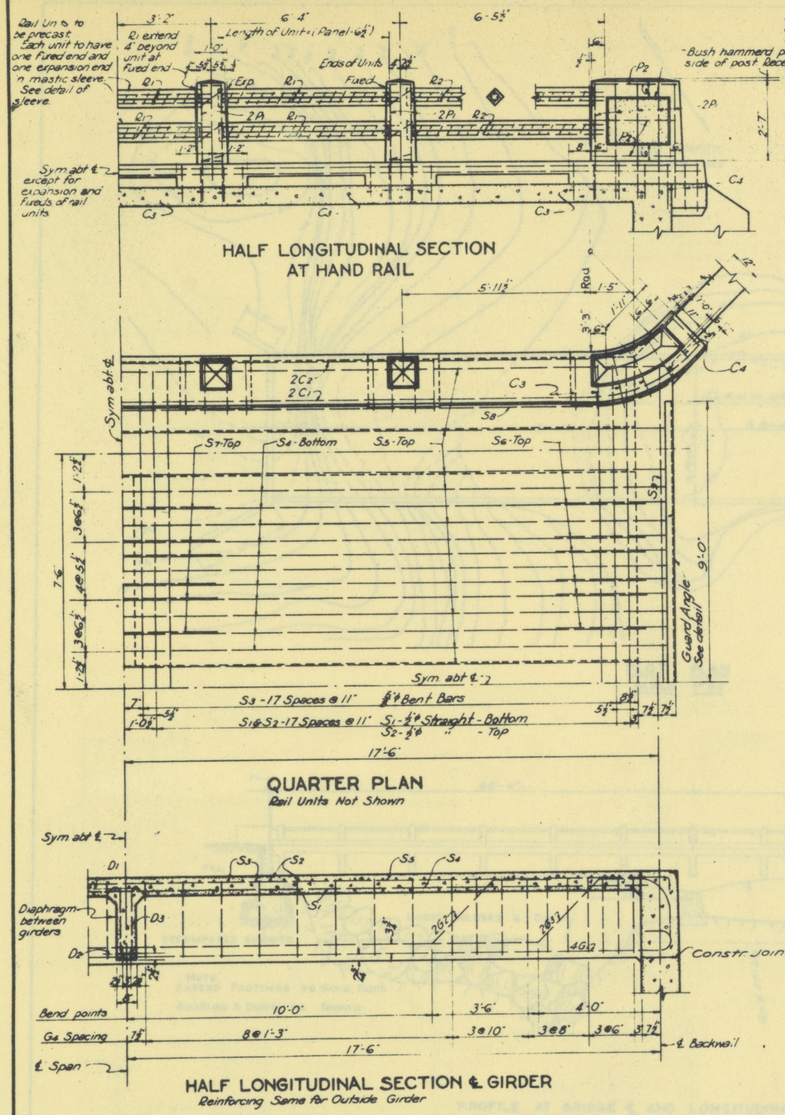
*Lengths shown are total lengths of bars before bending.

Camber Note:
In constructing forms allow temporary camber as follows to compensate for deflection.

SPAN	Camber at Center of Span
10'-0"	1/4
15'-0"	3/8
20'-0"	1/2
25'-0"	5/8

CONCRETE QUANTITIES				
SPAN	Concrete	Sand	Stone	Cement
Feet	Cu. Yds.	Cu. Yds.	Cu. Yds.	Bags
10	10.2	5.1	8.2	67
15	17.8	8.9	14.3	117
20	27.4	13.7	22.0	180
25	38.8	19.4	31.0	254

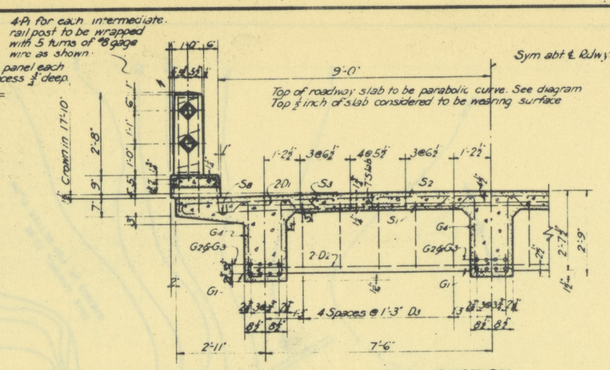
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REINFORCED CONCRETE SLAB BRIDGES
19'-0" ROADWAY – 30° SKEW
NOMINAL SPANS – 10'-0" TO 25'-0"
SKEWED SPANS – 8'-8" TO 21'-7¾"
DESIGNED MODIFICATION OF DWG. B-901 DRAWN C. C. D.
CHECKED J. S. M. TRACED C. C. D.
RECOMMENDED FOR APPROVAL J. S. M. DATE JANUARY 1938
APPROVED REGIONAL ENGINEER



HALF LONGITUDINAL SECTION AT HAND RAIL

QUARTER PLAN
Rail Units Not Shown

HALF LONGITUDINAL SECTION ℄ GIRDER
Reinforcing Same for Outside Girder



TYPICAL HALF CROSS SECTION
NEAR DIAPHRAGM

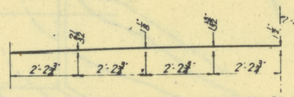
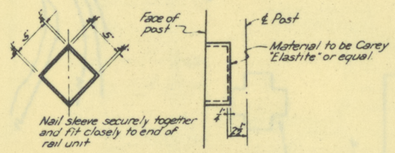
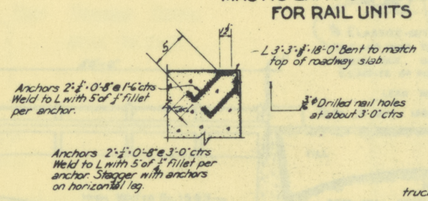


DIAGRAM OF TOP OF ROADWAY SLAB



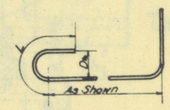
MASTIC EXPANSION SLEEVE FOR RAIL UNITS



SECTION AT GUARD ANGLE
Scale: 1½" = 1'-0"

BAR DETAILS - ONE SPAN

Mark	Location	Size	Total Length	No. per	Details
G1	Girders	1¼"ϕ	38'-4"	12	35'-0"
G2	"	1¼"ϕ	29'-8"	6	
G3	"	1¼"ϕ	39'-9"	6	
G4	Girders	¾"ϕ	7'-1"	108	A: 1'-1½", B: 2'-3½"
D3	Diaphragm	¾"ϕ	5'-9"	10	4½" 2'-0¾"
D1	Diaphragm	⅜"ϕ	16'-6"	2	Straight
D2	"	⅜"ϕ	16'-0"	2	"
S1	Slab Bott Trans	¾"ϕ	18'-0"	36	"
S2	Slab-Top-Trans	¾"ϕ	21'-6"	36	
S3	Slab-Transverse	⅝"ϕ	22'-3"	36	
S4	Slab-Bott-Long	½"ϕ	34'-6"	22	Straight
S5	Slab-Top-Long.	½"ϕ	36'-6"	18	
S6	Slab-Top-Long	½"ϕ	4'-1"	14	
S7	" " "	½"ϕ	6'-0"	12	Straight
S8	Slab	½"ϕ	19'-2"	4	A: 30° B: 0 R: 5'-0"
C1	Curb	½"ϕ	20'-6"	8	A: 45° B: 4" R: 4½"
C2	"	½"ϕ	19'-6"	8	A: 45° B: 4" R: 3'-4½"
C3	"	½"ϕ	3'-6"	48	
C4	"	½"ϕ	3'-6"	12	
P1	HR Posts	¾"ϕ	3'-10"	72	Straight
P2	End HR Posts	⅞"ϕ	7'-10"	12	
R1	Rail Units	¾"ϕ	6'-0½"	48	Straight
R2	" "	¾"ϕ	6'-2"	32	"
S9	Slab-Top Trans.	½"ϕ	20'-6"	2	Straight



Size	D	L
¾"	2½"	6"
⅞"	3"	8"
1"	3½"	10"
1¼"	5¼"	1'-2"
1¾"	7½"	1'-8"

GENERAL NOTES

Design Live Load: H-15, A.A.S.H.O. Specifications, 2-15 ton trucks passing, 30% impact, ⅛ of truck on rear axle.

All concrete in superstructure to be Class A. All concrete in substructure to be Class B.

Class A concrete to be approx. 1:2:3 mix with not less than 6½ sacks of cement per cu. yd.

Class B concrete to be approx. 1:2:4 " " " " " "
5½ sacks of cement per cu. yd.

Maximum aggregate 1½".

All reinforcing bars to have at least a 2" covering outside of bars except in slab where 1" covering is required.

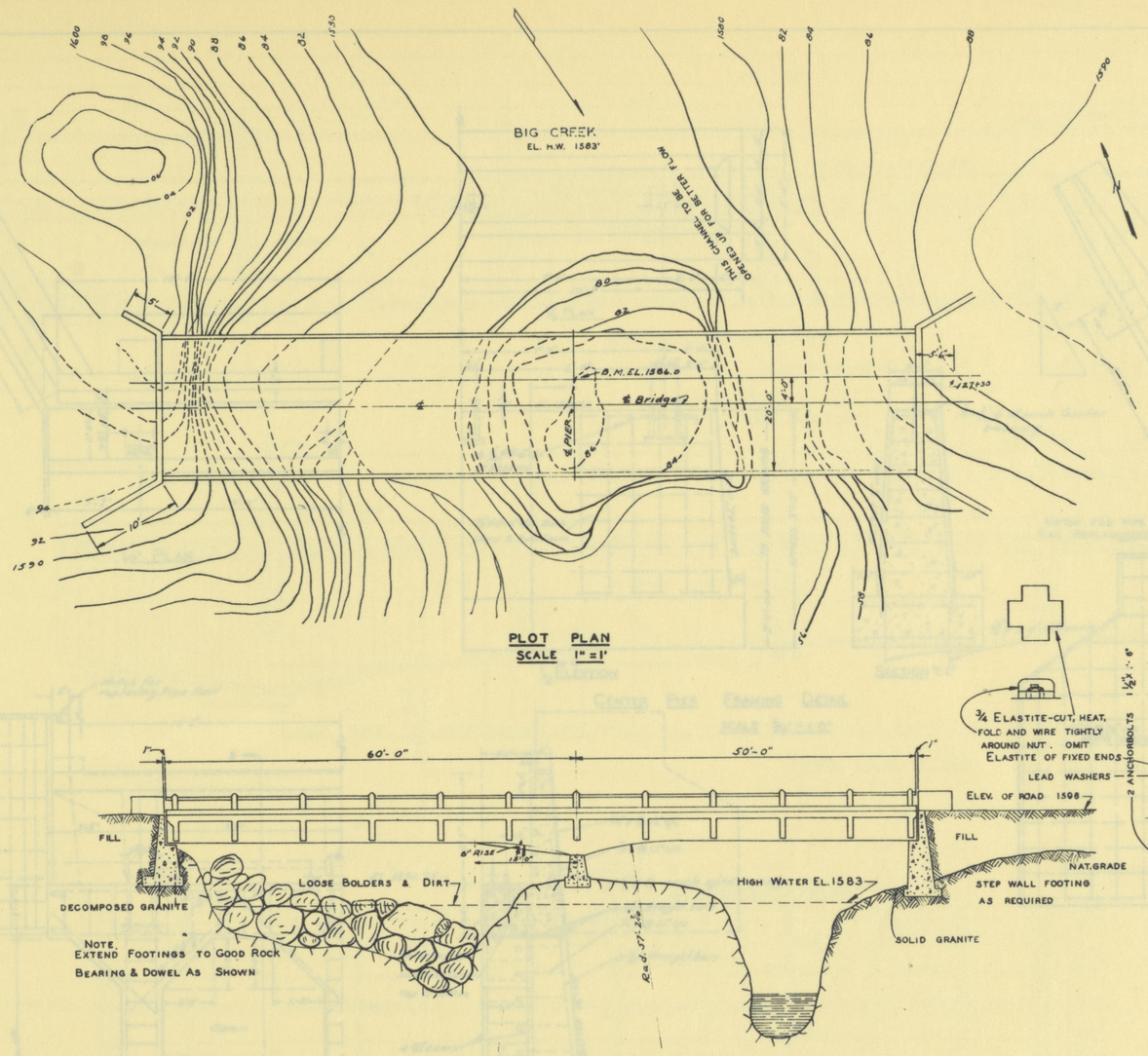
All reinforcing to be deformed bars of structural or intermediate grade.

Dimensions shown are to rod centers.

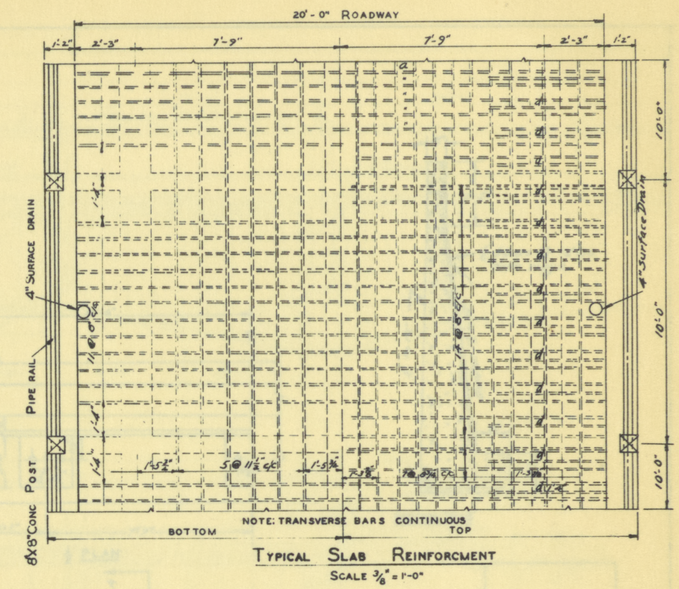
Designed N. Bertwell
Traced L.H. Carroll
Checked O.J. K.W.
Approved C.E. Andrews
Regional Engineer.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
STANDARD CONCRETE BRIDGE SUPER STRUCTURE
SPAN 35'-0" 18'-0" ROADWAY
Scale: ½" = 1'-0" unless otherwise noted
Sept. 1935

DRG. NO. 154.

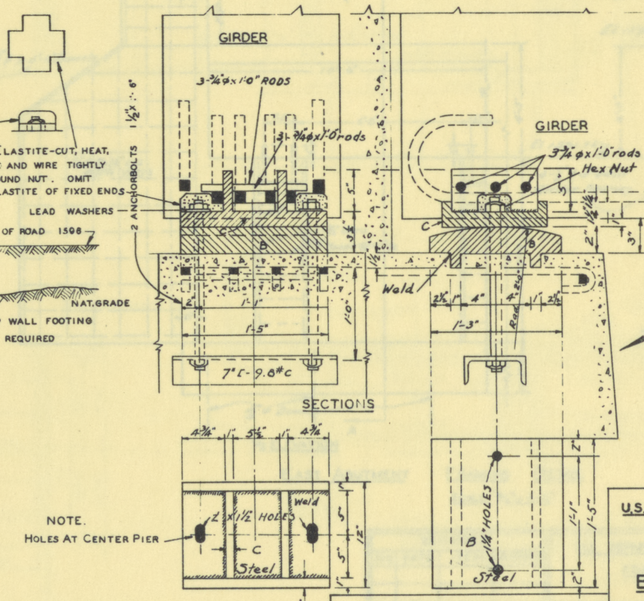


PLOT PLAN
SCALE 1" = 1'



TYPICAL SLAB REINFORCMENT
SCALE 3/8" = 1'-0"

PROFILE AT BRIDGE ℄ AND LONGITUDINAL SECTION OF BRIDGE
LOOKING UP STREAM
SCALE 1" = 10'



TYPICAL BEARING DETAIL
SCALE 1½"
NINE REQUIRED

REVISIONS

No.	Date	Item	By	Authority

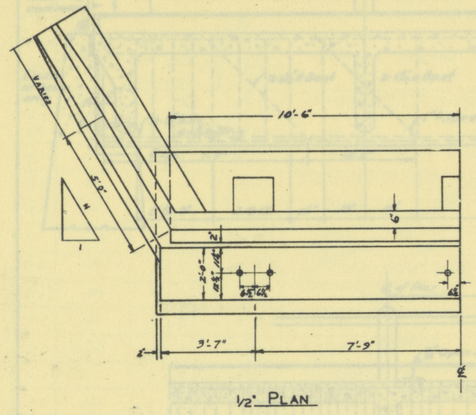
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

BIG CREEK BRIDGE

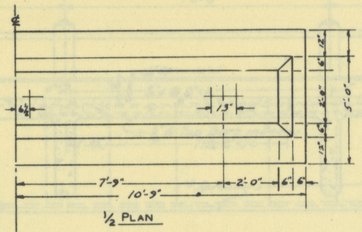
LOADING H-15 ROADWAY 20'
SIERRA NATIONAL FOREST
DATE 12-14-35
SCALES AS NOTED

DESIGNED	DESIGN CHECK'D	DRAWN	TRACED	TRAC'G CK'D
J.H.L. E.G.H	N.W.M. E.R.H.	H.W.B.	R.A.C.	N.W.M.

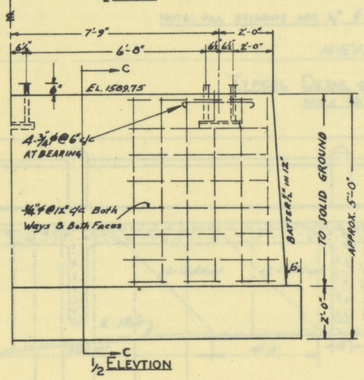
APPROVED BY E.W. Kramer
REGIONAL ENGINEER
SHEET 1 OF 4



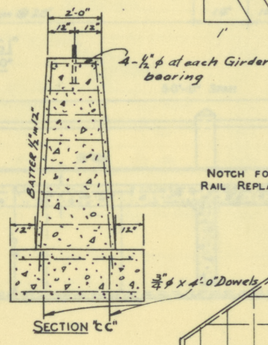
½ PLAN



½ PLAN



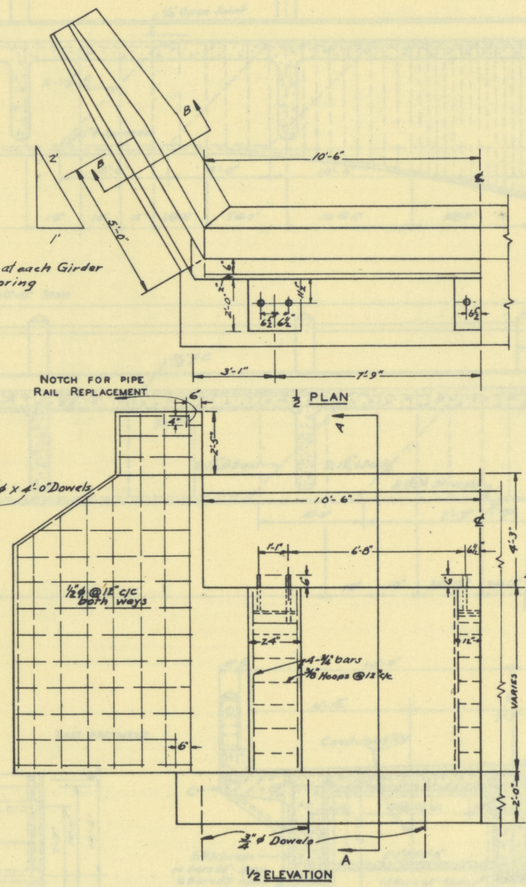
½ ELEVTION



SECTION "C-C"

CENTER PIER FRAMING DETAIL

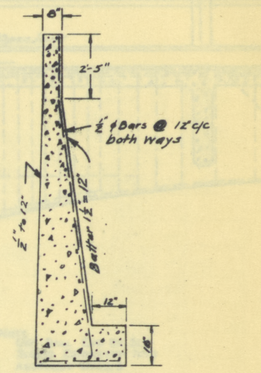
SCALE ⅜" = 1'-0"



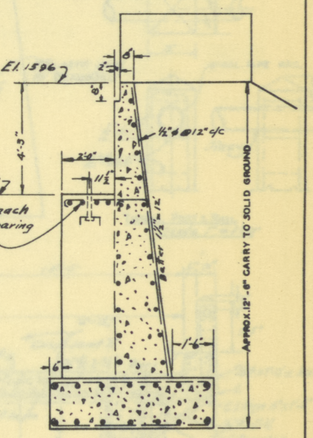
½ ELEVATION

EAST ABUTMENT FRAMING DETAIL

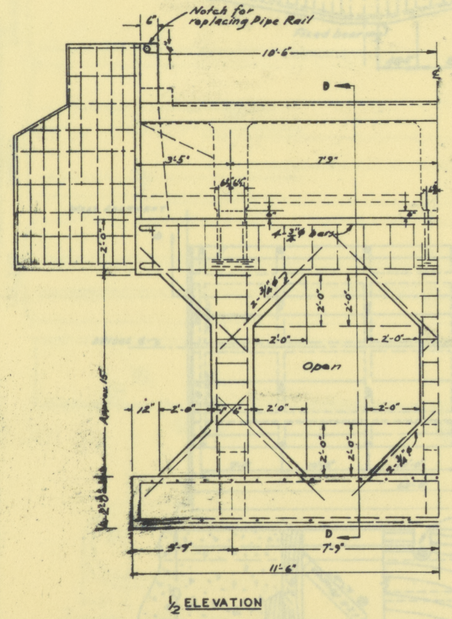
SCALE ⅜" = 1'-0"



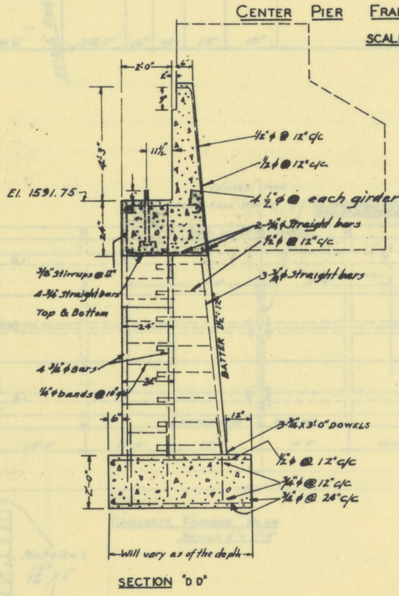
SECTION "B-B"



SECTION "AA"



½ ELEVATION



SECTION "D-D"

WEST ABUTMENT FRAMING DETAIL

SCALE ⅜" = 1'-0"

REVISIONS			
NO	DATE	ITEM	AUTHORITY

U.S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

REGION 5

BIG CREEK BRIDGE

LOADING H-15 ROADWAY 20'

SIERRA NATIONAL FOREST

DATE 12-14-35

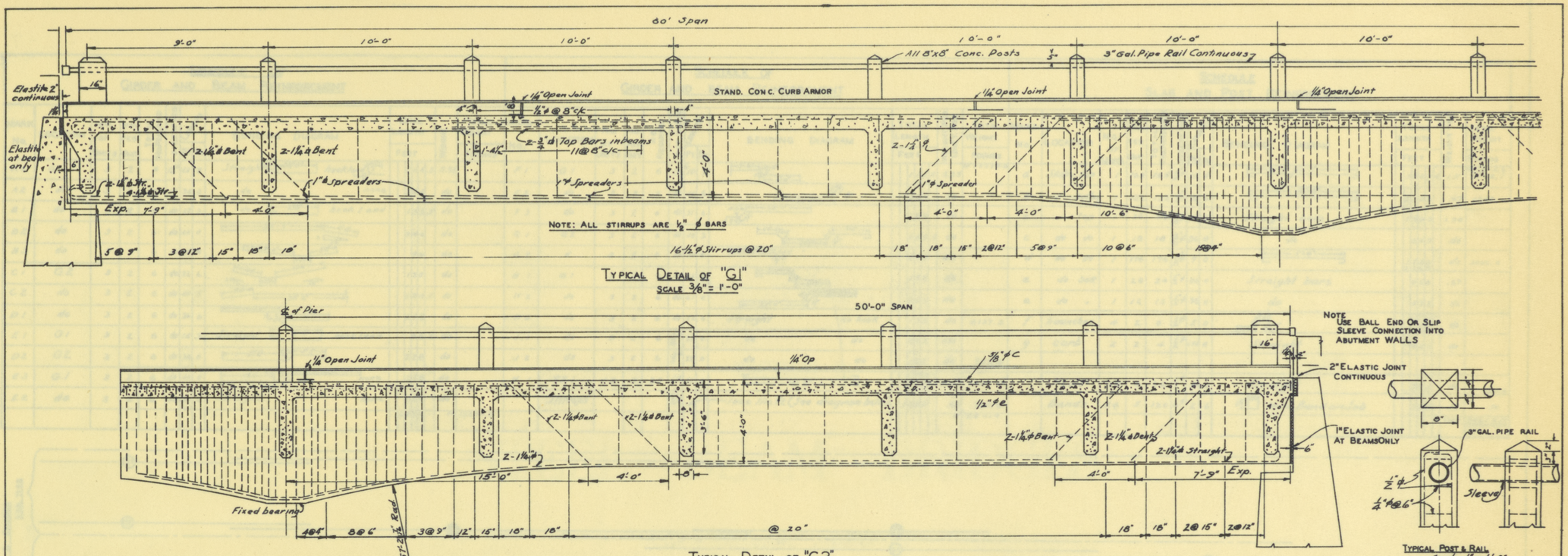
SCALES AS NOTED

DESIGNED J.H.L. E.G.H | DESIGN CHECKED N.W.M. E.R.H. | DRAWN H.W.B. | TRACED R.A.C. | TRACING CH'KD N.W.M.

APPROVED BY E.W. Kramer REGIONAL ENGINEER

SHEET 2 OF 4

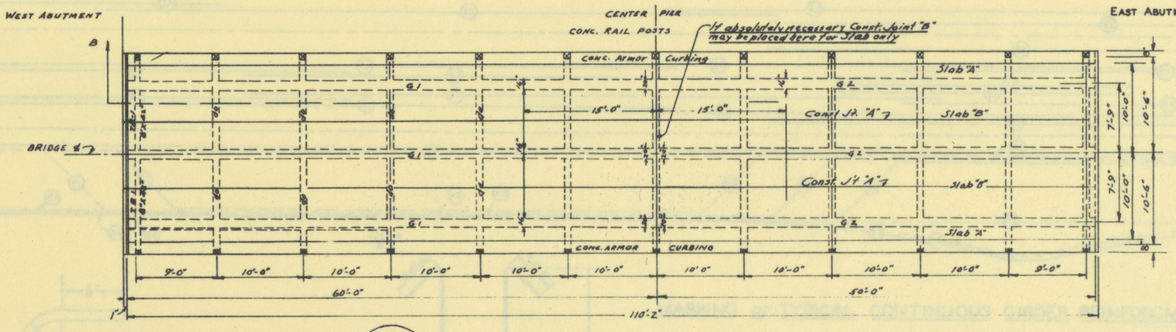
CORRECT John E. Lawrence CIVIL ENGINEER



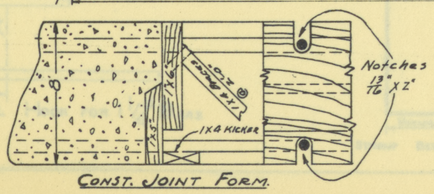
TYPICAL DETAIL OF "G1"
SCALE 3/8" = 1'-0"

TYPICAL DETAIL OF "G2"

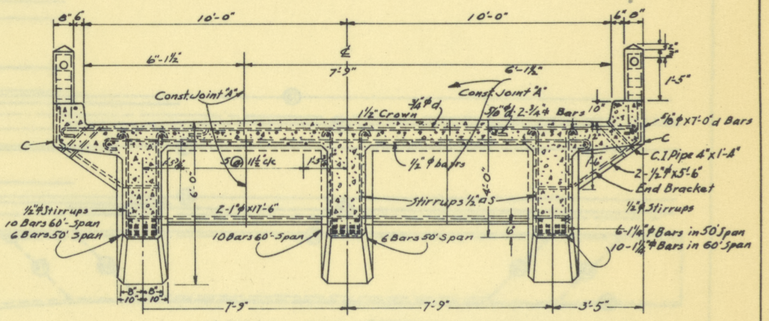
TYPICAL POST & RAIL
Scale 1" = 1'-0"



CONCRETE FRAMING PLAN
SCALE 1/8" = 1'-0"



CONST. JOINT FORM.



TYPICAL CROSS SECTION
SCALE 3/8" = 1'0"

NOTE:
ALL REINFORCMENT IS TO BE ACCURATELY PLACED AS INDICATED AND AT THE DIRECTION OF THE FIELD ENGINEER. ALL INTERSECTING BARS ARE TO BE SECURELY WIRED TO ASSURE AGAINST DISPLACEMENT WHILE CONCRETE IS BEING POURED. WHERE SPLICES ARE NECESSARY BARS SHALL BE LAPPED 50 DIA. OF THE BAR. IN GENERAL, STANDARD PRACTICE IS TO BE FOLLOWED BUT NO SPLICING IS TO BE DONE EXCEPT AT DIRECTION OF FIELD ENGINEER.

REVISIONS				
NO.	DATE	ITEM	BY	ATHOR'Y

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 5

BIG CREEK BRIDGE

LOADING - H 15 ROADWAY 20'
SIERRA NATIONAL FOREST
DATE 12-14-35
SCALES AS NOTED
DESIGNED J.H.L. E.R.H. DESIGN CH'KD E.R.H. DRAWN N.W.M. H.W.B. TRACED R.A.C. TRAC'NG CH'K'D N.W.M.
APPROVED BY E.W. Kramer
REGIONAL ENGINEER
SHEET 3 OF 4

CORRECT Spencer K. Armstrong
CIVIL ENGINEER

SCHEDULE OF GIRDER AND BEAM REINFORCMENT

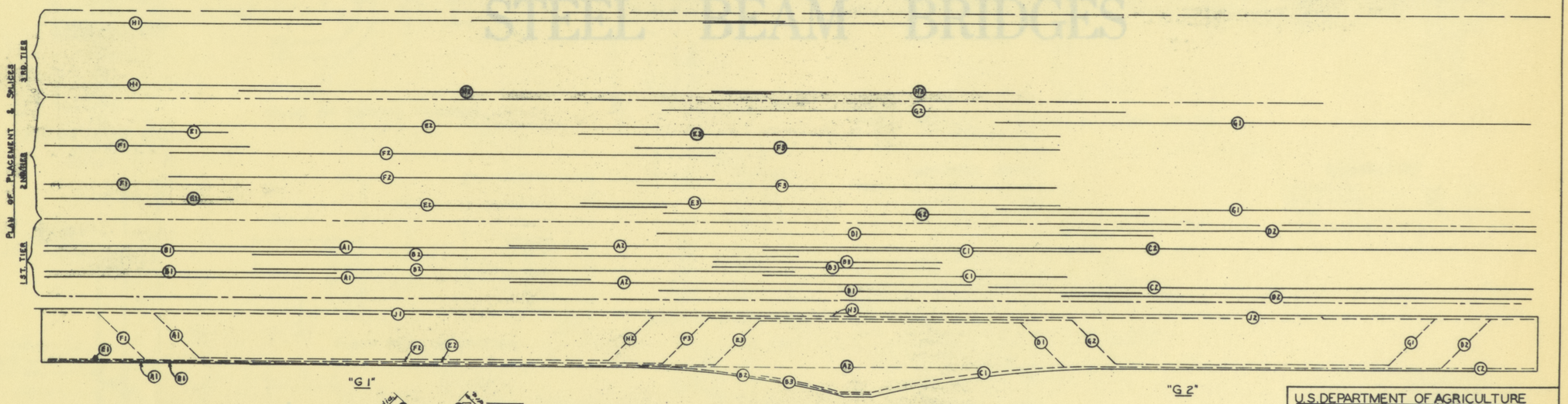
MARK No.	LOCATION	No. OF UNITS	No. PER UNIT	TOTAL No. REQUIRED	SIZE OF ROD	LENGTH FT.	LENGTH IN.	BENDING DIAGRAM	TOTAL LENGTH FEET	WEIGHT	TOTAL WEIGHT POUNDS
A1	G1	3	2	6	1¼"	40	9	Straight 40'-0" hook1end	244.3	3.35	
A2	do	3	2	6	do	34	0	do none	204.0	do	
B1	do	3	2	6	do	22	3	do 2'10" hook1end	133.5	do	
B2	do	3	2	6	do	40	0	34'-0" 6'-0"	240.0	do	
B3	do	3	2	6	do	16	0	9'-6" 5'-0"	96.0	do	
C1	G2	3	2	6	do	22	6	6'-6" 16'-0"	135.0	do	
C2	do	3	2	6	do	40	5	5'-0" 34'-6"	234.5	do	
D1	do	3	2	6	do	34	6	12'-0" 6'-6"	211.9	do	
E1	G1	3	2	6	do	14	3	Straight 13'-6" hook1end	85.5	do	
D2	G2	3	2	6	do	38	0	29'-6" 31'-3"	228.0	do	
E3	G1	3	2	6	do	40	0	16'-6" 24'-6" none	240.0	do	
E2	do	3	2	6	do	38	0	Straight none	228.0	do	
									2293.0		12294.3

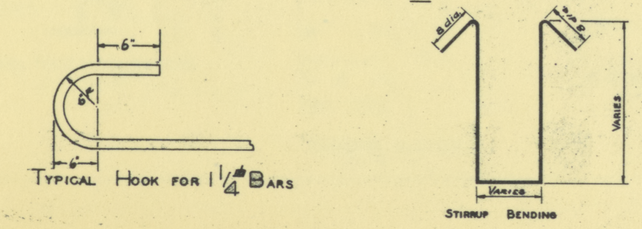
SCHEDULE OF GIRDER AND BEAM REINFORCMENT

MARK No.	LOCATION	No. OF UNITS	No. PER UNIT	NO. REQUIRED	SIZE OF ROD	LENGTH FT.	LENGTH IN.	BENDING DIAGRAM	TOTAL LENGTH FEET	WEIGHT PER UNIT FT. ROD	TOTAL WEIGHT POUNDS
F1	G1	3	2	6	1¼"	10	9	12'-6" 6'-0" 4'	112.5	3.35	
F2	do	3	2	6	do	40	6	36'-0" 4'	240.3	do	
F3	do	3	2	6	do	31	6	4'-6" 28'-0" 4' 2'-0"	189	do	
G1	G2	3	2	6	do	43	3	6'-6" 7'-6" 24'-6" 4'	259.3	do	
G2	d	3	2	6	do	34	0	24'-6" 20'-6" 4'	204.0	do	
H1	G1	3	2	6	do	22	0	8'-6" 8'-6" 4'	132	do	
H2	do	3	2	6	do	41	0	4'-6" 32'-0" 4'	246	do	
H3	do	3	2	6	do	22	6	Straight no hook	135	do	6137.3
J1	do	3	2	6	⅝"	37	0	do do	222	1.91	
J2	do	3	2	6	⅝"	27	0	do do	162	do	733.4
K1	T.B.1	12	2	24	½"	17	6	16'-8"	420	2.67	1121.4
	Stirrups				½"			1006 lin. ft. (See diagram below)	1006	.67	727.6
											23 614

SCHEDULE SLAB AND POST REINFORCMENT

MARK No.	LOCATION	No. OF UNITS	No. PER UNIT	TOTAL No. REQUIRED	SIZE OF ROD	LENGTH FT.	LENGTH IN.	BENDING DIAGRAM	TOTAL LENGTH FEET	WEIGHT PER	TOTAL WEIGHT POUNDS
a	Slab - top	1	165	165	⅝" square	23	4	22'-2"	3845.4	1.5	5774.1
b	" - bottom	1	132	132	½" square	20	6	19'-8"	2706	.67	1813.
c	" - top	1	36	36	⅝" square	40	0	Straight bars	1440	1.04	
c	do do	1	18	18	⅝" square	36	0	do	648	do	
d	do do	1	176	176	⅝" square	7	0	5'-8"	1232	do	3422.6
e	do bott.	1	24	24	½" round	40	0	Straight bars	960	.67	
e	do "	1	12	12	½" round	36	0	do	432	do	
f	haunches	4	2	8	½" round	5	0	1'-0" 2'-6"	40	do	
g	curb	2	2	4	½" round	110	0	Straight	440	do	
	Posts	24	4	96	½" square	4	0	Straight	384	do	1511.8
	Bands	24	5	120	¼" square	2	6	Note: Band on Job	300	.17	51.
										Total	3566.4





MARKING OF TYPICAL CONTINUOUS GIRDER REINFORCMENT AND SPLICE DETAIL

SCALE ¼ = 1'-0"

REVISIONS				
NO.	DATE	ITEMS	BY	AUTHORITY

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 5

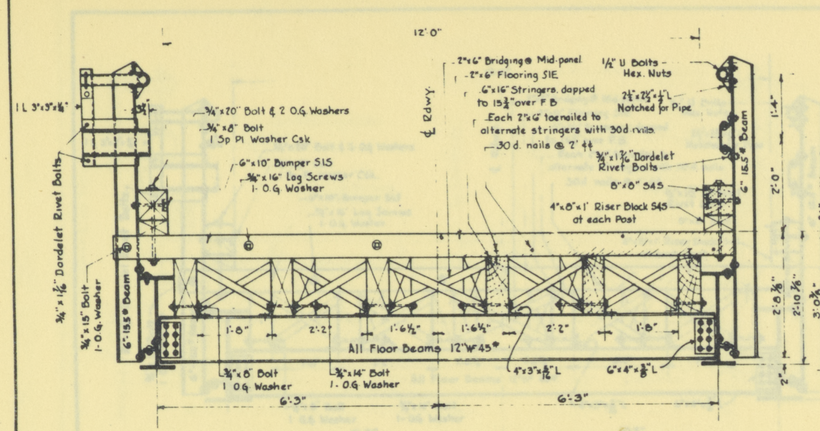
BIG CREEK BRIDGE

LOADING H-15 — ROADWAY 20'
SIERRA — NATIONAL FOREST
DATE 1-8-36
SCALES
DESIGNED J.H.L. — DESIGN CH'K'D E.R.H. — DRAWN H.M.B. — TRACED — TRAC. CH'K'D M.M.M.
J.H.L. — E.R.H.
APPROVED BY E.W. Kramer
SHEET 4 OF 4 — REGIONAL ENGINEER

STEEL BEAM BRIDGES

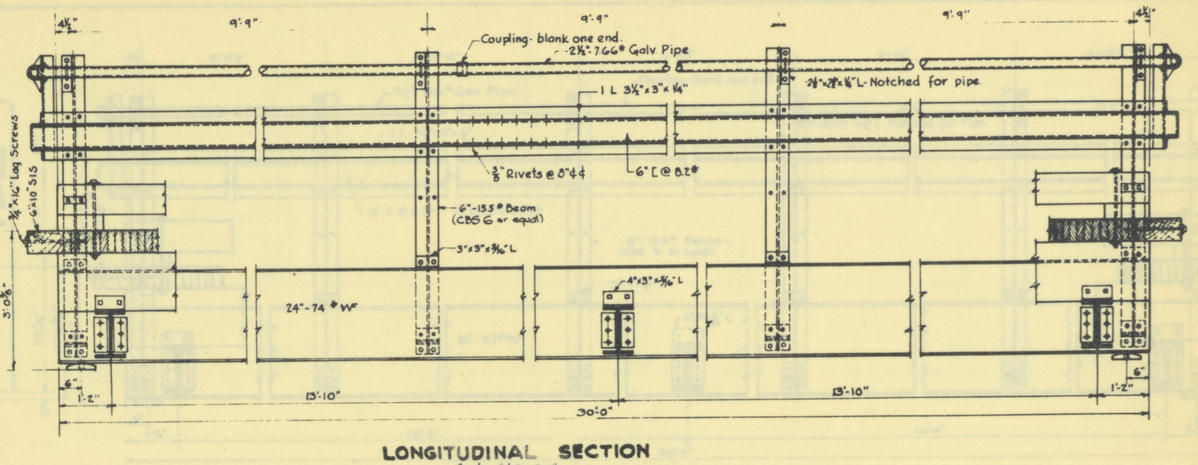
SECTION 3

STEEL BEAM BRIDGES



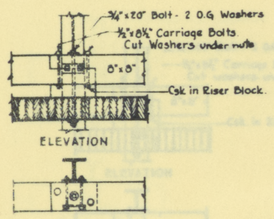
HALF END ELEVATION HALF ROADWAY SECTION

Scale ¾"=1'-0"



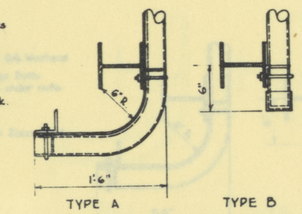
LONGITUDINAL SECTION

Scale ¾"=1'-0"



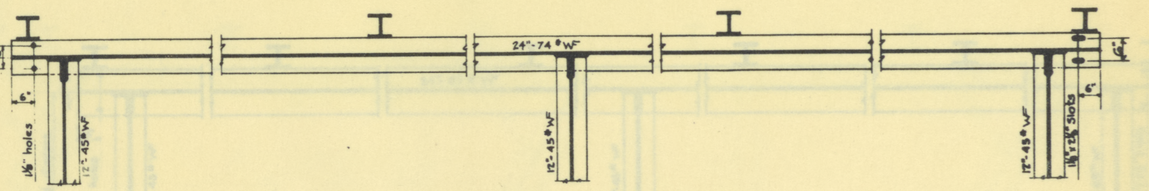
FELLOE GUARD SPLICE

Scale ¾"=1'-0"



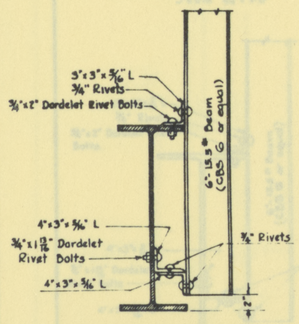
PLAN OF RAILING TERMINAL

Scale 1½"=1'-0"



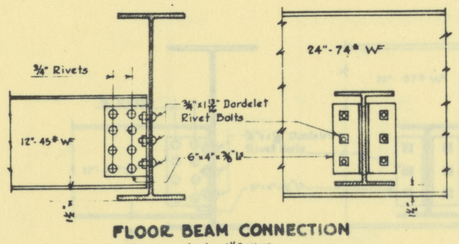
PART SECTION — GIRDER & FLOOR BEAMS

Scale ¾"=1'-0"



RAIL POST CONNECTION

Scale 1½"=1'-0"



FLOOR BEAM CONNECTION

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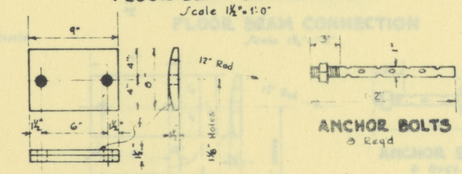


BEARING PLATES

Scale 1½"=1'-0"

ANCHOR BOLTS

8 Reqd

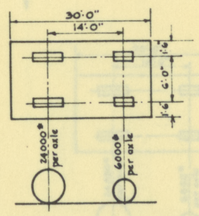
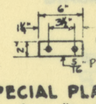


DIAGRAM - 15 TON TRUCK



SPECIAL PLATE WASHER

Scale 1½"=1'-0"

GENERAL NOTES

Loading: Dead Load - Timber, 60 lbs per cu.ft.
Live Load - One 15 Ton Truck.
Impact - 30% on steel, none on timber.
Federal Specifications for Structural Steel, QQ-S-711 Class A, or A.S.T.M. Specs.
" " " Rivet Steel, QQ-S-711 Class C.
Rivets to be ¾" ϕ except for ⅞" ϕ in flanges of 6" L.
Field connections to be made with Dordelet Rivet Bolts.
Open holes to be subpunched and reamed to 1/16" in diameter.
Structural Steel to be given one shop coat of red lead paint, one field coat of red lead paint and one field coat of aluminum paint.
Shop plans must be approved by the Engineer before fabrication is started.
Timber: All lumber to be of Coast Region Douglas Fir graded in accordance with the Grading and Dressing Rules of the West Coast Lumbermens Assn., dated July 1 1934.
Timber shall be of the following grades:
Stringers - Dense Select Structural.
Decking - Select Structural.
Other Timber No. 1. Dimension.
Hardware All hardware except nails shall be furnished with structural steel. Nails will be furnished by the U.S. Forest Service.

QUANTITIES

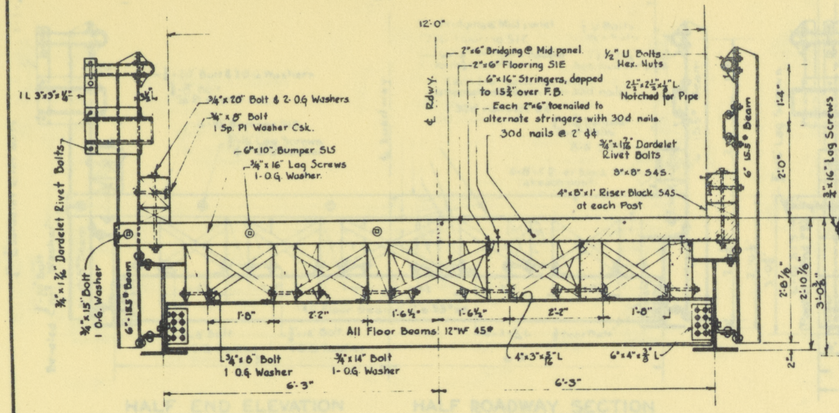
Structural Steel	9,650	Lbs
Bolts & Washers	323	"
Timber	4.62	M.B.M.

Designed G. J. K. B.B.
Traced B.H.M.
Checked W/ Detail
Approved [signature] Regional Engineer
7/10/35

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No 1.

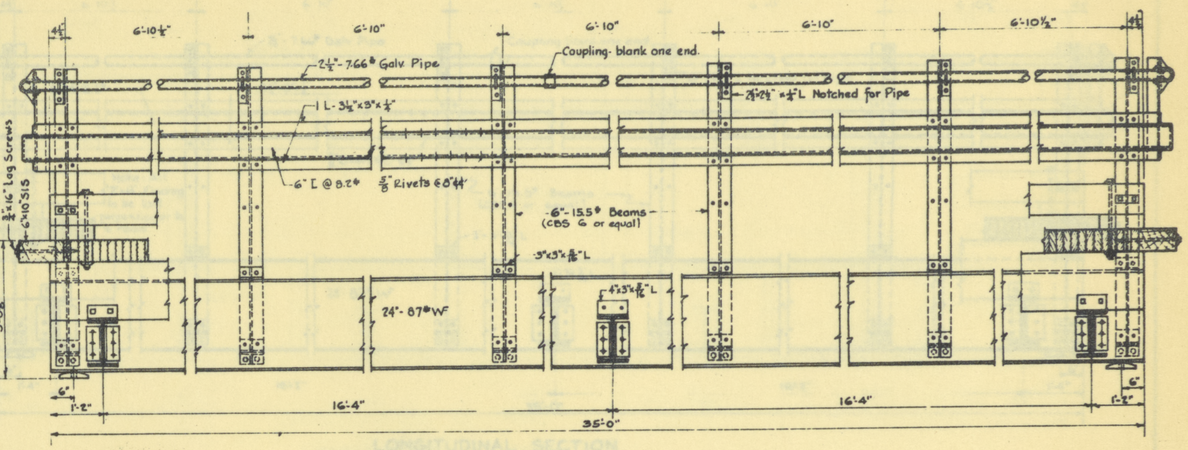
TYPICAL I-BEAM SPAN

30'-0" SPAN 12'-0" ROADWAY
TIMBER FLOOR 15 TON LOADING
Scale as shown
JUNE 1935 Sheet 1 of 1
Drg No. 110



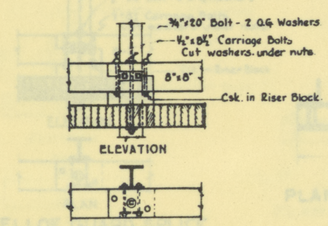
HALF END ELEVATION — HALF ROADWAY SECTION

Scale ¾" = 1'-0"



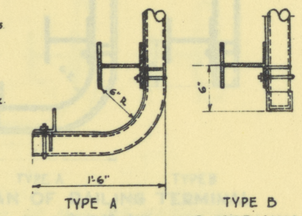
LONGITUDINAL SECTION

Scale ¾" = 1'-0"



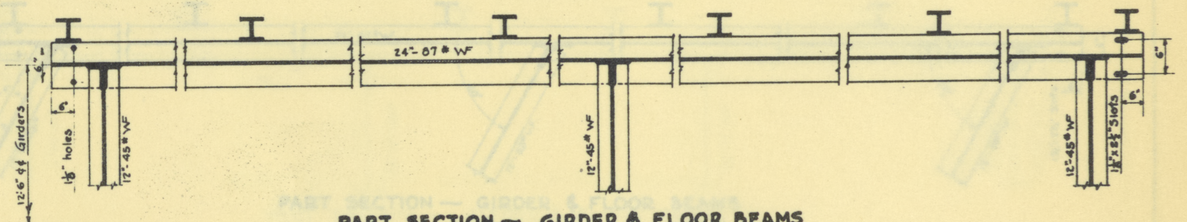
FELLOE GUARD SPLICE

Scale ¾" = 1'-0"



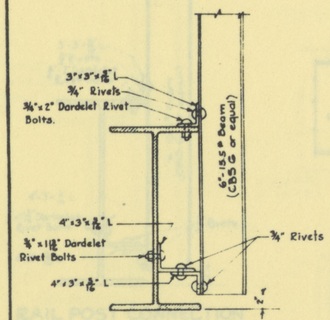
PLAN OF RAILING TERMINAL

Scale 1½" = 1'-0"



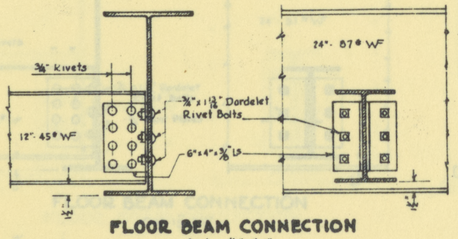
PART SECTION — GIRDER & FLOOR BEAMS

Scale ¾" = 1'-0"



RAIL POST CONNECTION

Scale 1½" = 1'-0"



FLOOR BEAM CONNECTION

Scale 1½" = 1'-0"

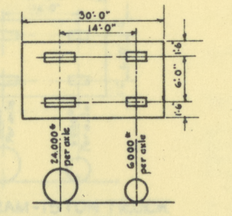
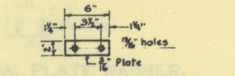
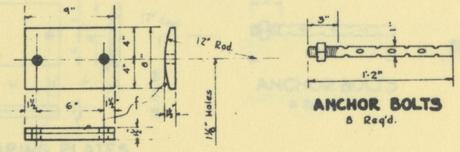


DIAGRAM- 15 TON TRUCK



SPECIAL PLATE WASHER

Scale 1½" = 1'-0"



BEARING PLATES

Scale 1½" = 1'-0"

ANCHOR BOLTS

8 Req'd.

GENERAL NOTES

Loading: Dead Load - Timber, 60 lbs per cu ft.
Live Load - One 15 Ton Truck.
Impact - 30% on steel, none on timber.
Federal Specifications for Structural Steel, QQ-S-711 Class A, or A.S.T.M. Spec's.
" " " Rivet Steel, QQ-S-711 Class C.
Rivets to be ¾" ϕ except for ⅞" ϕ in flanges of 6" I.
Field connections to be made with Dardelet Rivet Bolts.
Open holes to be subpunched and reamed to 1⅛" in diameter.
Structural Steel to be given one shop coat of red lead paint, one field coat of red lead paint and one field coat of aluminum paint
Shop plans must be approved by the Engineer before fabrication is started.
Timber: All lumber to be of Coast Region Douglas Fir graded in accordance with the Grading and Dressing Rules of the West Coast Lumbermen's Assn., dated July 1 1934.
Timber shall be of the following grades:
Stringers - Dense Select Structural.
Decking - Select Structural.
Other Timber No 1. Dimension.
Hardware: All hardware except nails shall be furnished with structural steel. Nails will be furnished by the U. S. Forest Service.

QUANTITIES

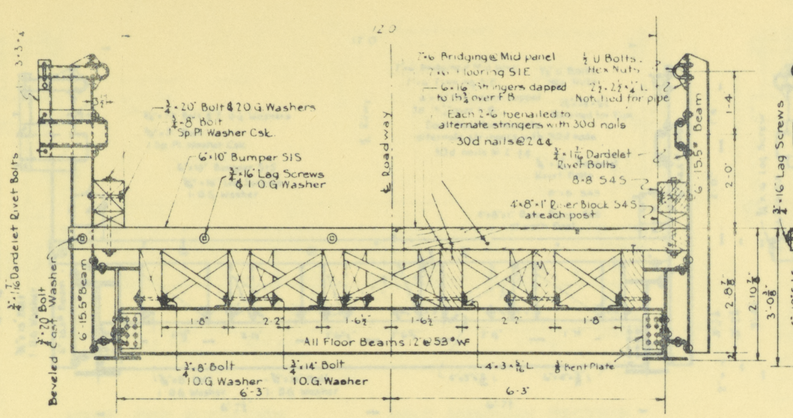
Structural Steel	11,900	Lbs.
Bolts & Washers	350	"
Timber	526	M. B. M.

Designed C. J. Kuhl
Traced D. H. M.
Checked W. Bartuff
Approved J. H. Haggerty
Regional Engineer

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No. 1

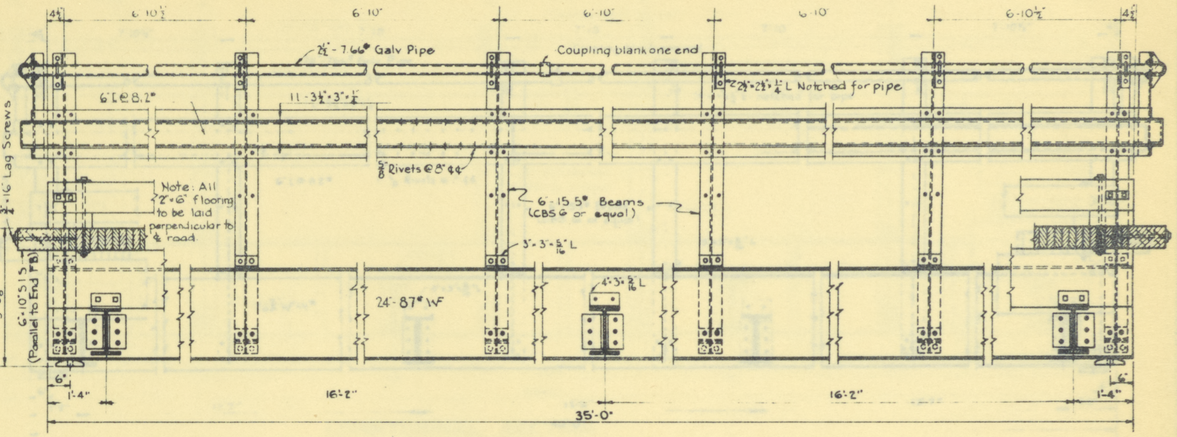
TYPICAL I-BEAM SPAN

35'-0" SPAN 12'-0" ROADWAY
TIMBER FLOOR 15 TON LOADING
Scale as shown.
JUNE 1935 Sheet 1 of 1
Drg No. 111



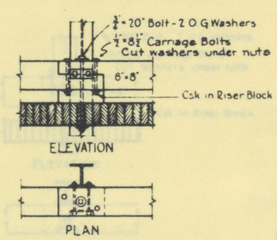
HALF END ELEVATION HALF ROADWAY SECTION

Scale ½" = 1'-0"



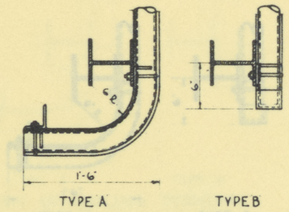
LONGITUDINAL SECTION

Scale ½" = 1'-0"



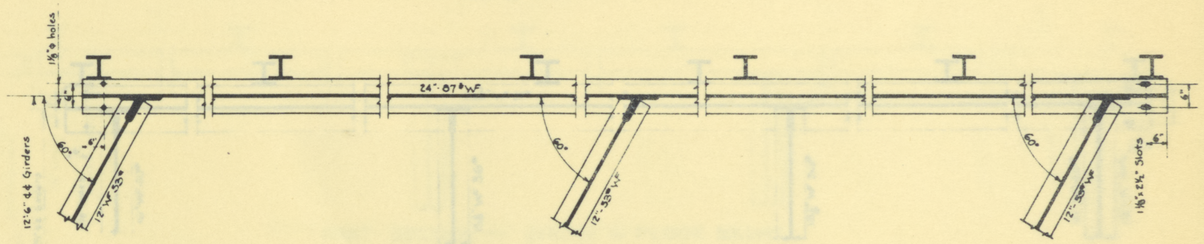
FELLOE GUARD SPLICE

Scale ¾" = 1'-0"



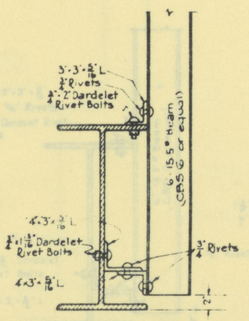
PLAN OF RAILING TERMINAL

Scale 1½" = 1'-0"



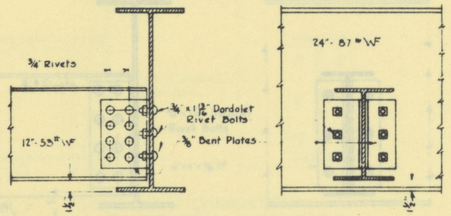
PART SECTION — GIRDER & FLOOR BEAMS

Scale ¾" = 1'-0"



RAIL POST CONNECTION

Scale 1½" = 1'-0"



FLOOR BEAM CONNECTION

Scale 1½" = 1'-0"

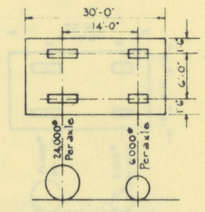
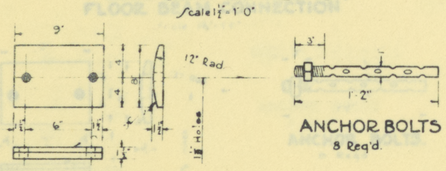


DIAGRAM - 15 TON TRUCK

SPECIAL PLATE WASHER

Scale 1½" = 1'-0"



BEARING PLATES

Scale 1½" = 1'-0"

ANCHOR BOLTS

8 Req'd.

GENERAL NOTES

Loading: Dead Load - Timber, 60 lbs. per cu ft
Live Load - One 15 Ton Truck.
Impact - 30% on steel none on timber
Federal Specifications for Structural Steel, QQ-S-711 Class A. or A.S.T.M. Specs.
" " Rivet Steel QQ-S-711 Class C.
Rivets to be ¾" ϕ except for ⅞" ϕ in flanges of 6"L.
Field connections to be made with Dardelet Rivet Bolts.
Open holes to be subpunched and reamed to ⅛" in diameter.
Structural Steel to be given one shop coat of red lead paint, one field coat of red lead paint and one field coat of aluminum paint. Shop plans must be approved by the Engineer before fabrication is started.
Timber: All lumber to be of Coast Region Douglas Fir graded in accordance with the Grading and Dressing Rules of the West Coast Lumbermens Assn, dated July 1934
Timber shall be of the following grades
Stringers - Dense Select Structural.
Decking - Select Structural.
Other Timber No 1 Dimension.
Hardware All hardware except nails shall be furnished with structural steel Nails will be furnished by the U.S. Forest Service.

QUANTITIES

Structural Steel	12,200	Lbs
Bolts & Washers	350	"
Timber	5.28	M. B. M.

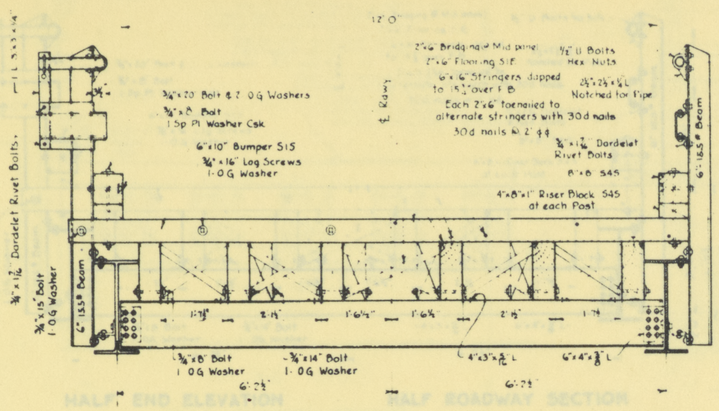
Designed Q. L. Keil
Traced D.H.M. & T.C.
Checked W. Boerthwell
Approved F. E. Thorne
Regional Engineer

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No 1

TYPICAL I-BEAM SPAN

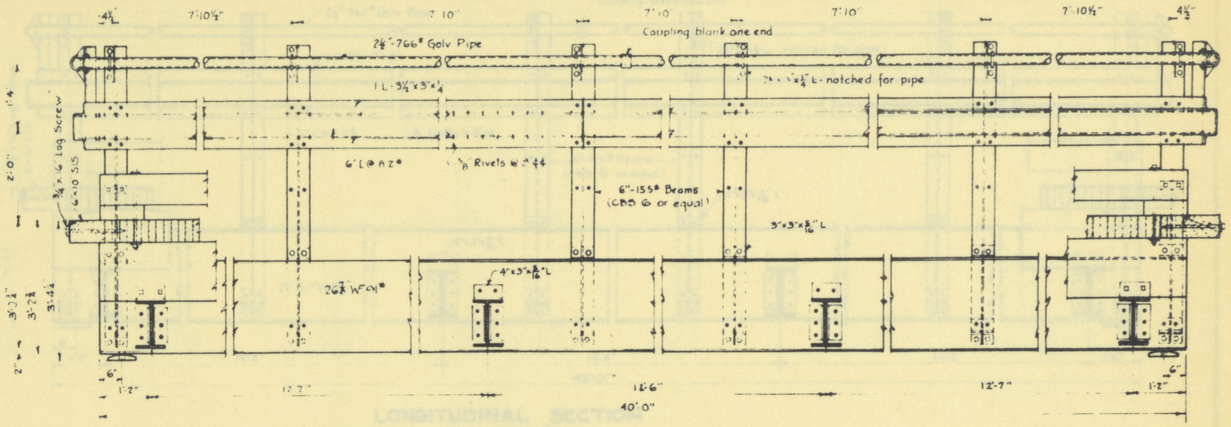
35'-0" SPAN 30° SKEW 12'-0" Roadway
TIMBER FLOOR 15 TON LOADING
Scale as shown
July 1935 Sheet 1 of 1

DR No 124



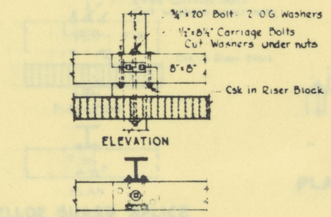
HALF END ELEVATION HALF ROADWAY SECTION

Scale 3/4" = 1'0"



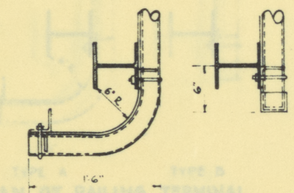
LONGITUDINAL SECTION

Scale 3/4" = 1'0"



FELLOE GUARD SPLICE

Scale 3/4" = 1'0"

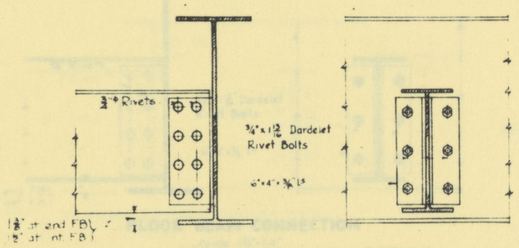


PLAN OF RAILING TERMINAL

Scale 1½" = 1'0"

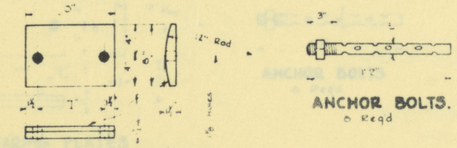
RAIL POST CONNECTION

Scale 1½" = 1'0"



FLOOR BEAM CONNECTION

Scale 1½" = 1'0"



BEARING PLATES

Scale 1½" = 1'0"

ANCHOR BOLTS. 6 Reqd

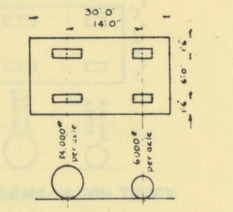
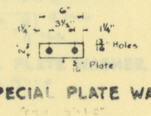
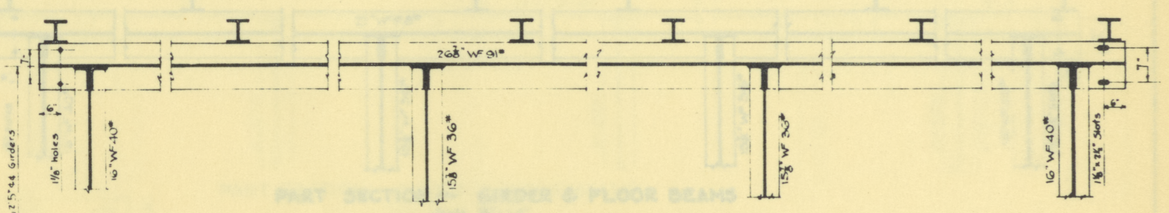


DIAGRAM - 15 TON TRUCK



SPECIAL PLATE WASHER

Scale 3"=1'0"



PART SECTION ~ GIRDER & FLOOR BEAMS

Scale 3/4" = 1'0"

GENERAL NOTES

Loading: Dead Load - Timber 60 lbs per cu ft.
Live Load - One 15 Ton Truck
Impact - 30% on steel, none on timber.

Specifications for Struct Steel: Federal Spec's QQ S 711 Class A, or A.S.T.M Spec's.
" " - Rivet Steel QQ S 711 Class C

Rivets to be ⅞" ø except for ¾" ø in flanges of 6" ℄.
Field connections to be made with Dardelet Rivet Bolts
Open holes to be subpunched and reamed to ⅛" in diameter.
Structural Steel to be given one shop coat of red lead paint, one field coat of red lead paint and one field coat of aluminum paint.
Shop plans must be approved by the Engineer before fabrication is started.
Timber: All lumber to be of Coast Region Douglas Fir graded in accordance with the Grading and Dressing Rules of the West Coast Lumbermens Assn., dated July 1, 1934
Timber shall be of the following grades:
Stringers - Dense Select Structural.
Decking: Select Structural
Other Timber: No 1 Dimension.

Hardware: All hardware except nails shall be furnished with structural steel. Nails will be furnished by the U.S. Forest Service.

QUANTITIES

Structural Steel	14,400	Lbs
Bolts & Washers	473	"
Timber	6.81	M.B.M.

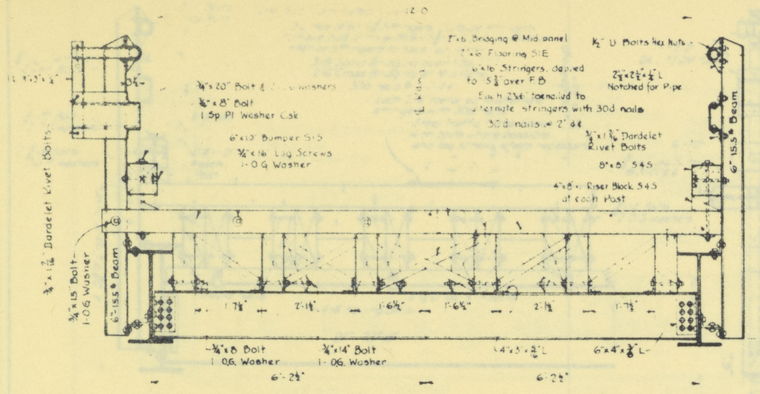
Designed O.J.K.
Traced H.M.
Checked W.P.
Approved [signature] Regional Engineer
7/16/35

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No. 1

TYPICAL I-BEAM SPAN

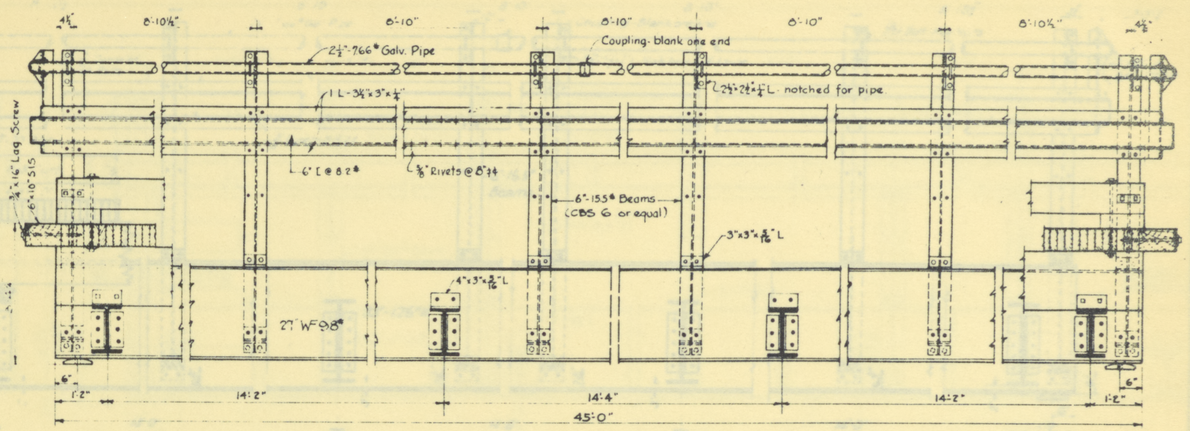
40'-0" SPAN 12'-0" ROADWAY
TIMBER FLOOR 15 TON LOADING
Scale as shown
JUNE 1935 Sheet 1 of 1

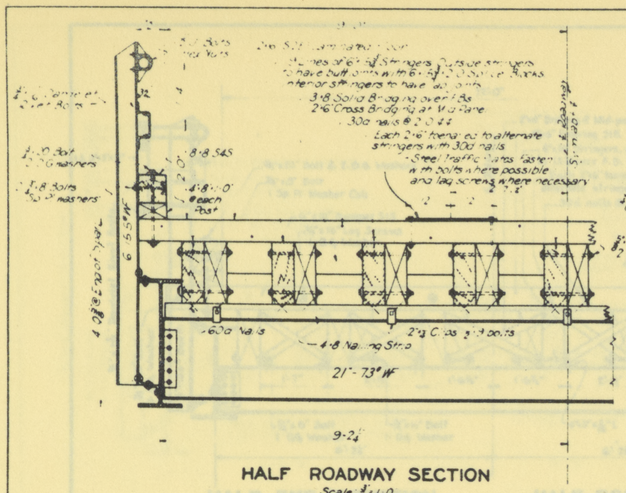
Drg No 112



HALF END ELEVATION HALF ROADWAY SECTION

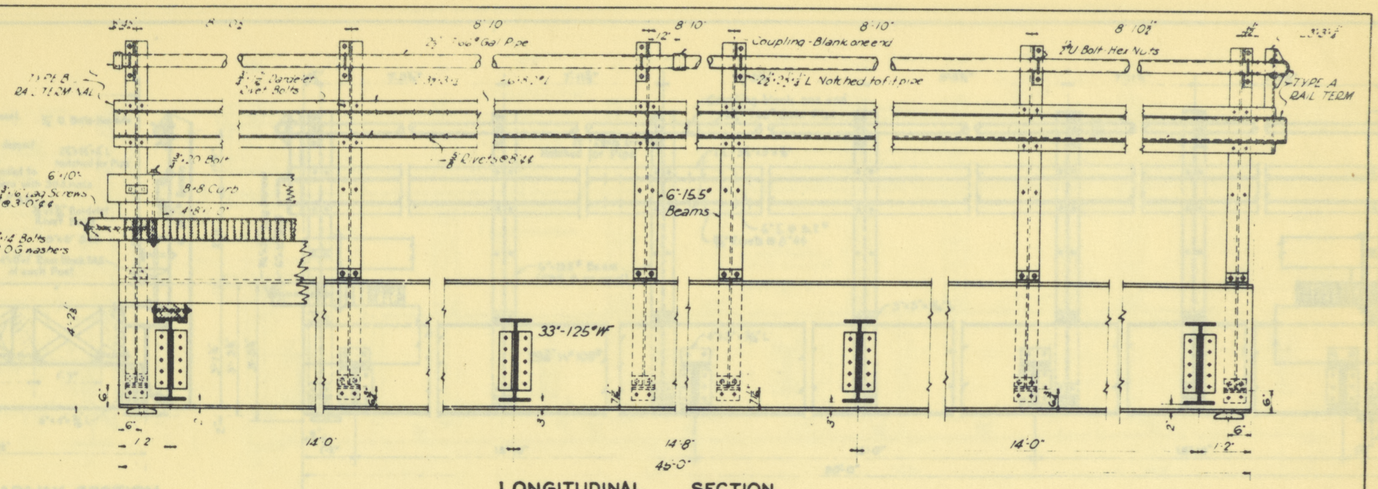
Scale 3/4" = 1'-0"


Coupling- blank one end
Galv. Pipe
Rivets @ 8"
Beams (CBS 6 or equal)
Lag Screw
Notched for pipe
Rivets @ 8"
Beams
(CBS 6 or equal)
Lag Screw
Rivets
Dardelet Rivet Bolts
Beam
Rivets
Dardelet Rivet Bolts
Beam
Rivets
Dardelet Rivet Bolts
Beam



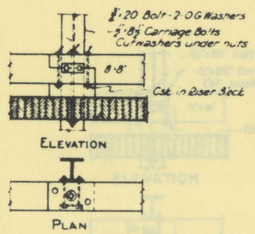
HALF ROADWAY SECTION

Scale $\frac{3}{4}$"=1'-0"



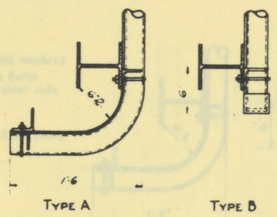
LONGITUDINAL SECTION

Scale $\frac{3}{4}$"=1'-0"



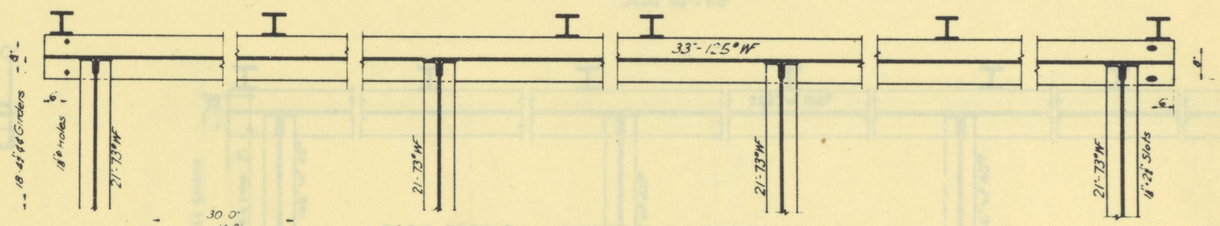
FELLOE GUARD SPLICE

Scale $\frac{3}{4}$"=1'-0"



PLAN OF RAILING TERMINAL

Scale $\frac{1}{2}$"=1'-0"



PART SECTION - GIRDER & FLOOR BEAMS

Scale $\frac{3}{4}$"=1'-0"

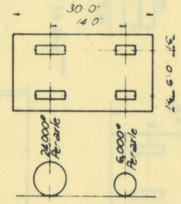
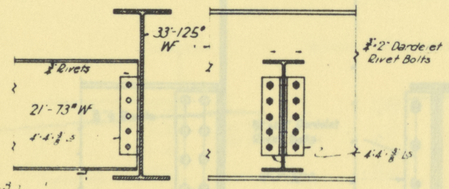
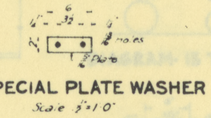


DIAGRAM - 15 TON TRUCK



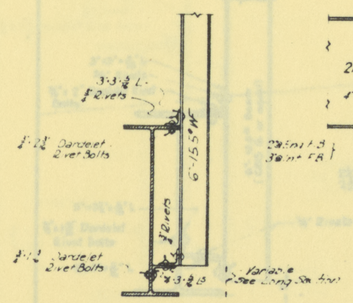
FLOOR BEAM CONNECTION

Scale 1"=1'-0"



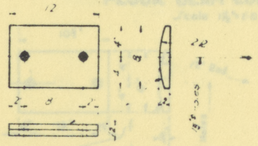
SPECIAL PLATE WASHER

Scale $\frac{3}{4}$"=1'-0"

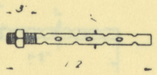


RAIL POST CONNECTION

Scale 1"=1'-0"

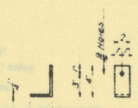


BEARING PLATES



ANCHOR BOLTS

R Reqd



CLIPS

GENERAL NOTES

Loading: Dead Load - Timber, 60 lbs per cu ft
Live Load - Two 15 Ton Trucks.
Impact - 30% on steel, none on timber
Federal Specifications for Structural Steel, QQ-S-711 Class A or AS.T.M. Spec. 9.
" " " Rivet " QQ-S-711 Class C
Rivets to be ¾" ø except for ⅞" ø in Flanges of 6"L
Field connections to be made with Dardelet Rivet Bolts.
Open holes to be subpunched and reamed to ¾" in diameter.
Structural Steel to be given one shop coat of red lead paint, one field coat of red lead paint and one field coat of aluminum paint
Shop plans must be approved by the Engineer before fabrication is started
Timber: All timber to be of Coast Region Douglas Fir graded in accordance with the Grading and Dressing Rules of the West Coast Lumbermans Assn, dated July 1934.
Timber shall be of the following grades:
Stringers - Dense Select Structural
Decking - Select Structural
Other Timber - No 1 Dimension
Hardware: All hardware except nails shall be furnished with structural steel. Nails will be furnished by the U.S. Forest service.

QUANTITIES

Structural Steel	21,200 lbs
Bolts and Washers	400 "
Timber	9.68 M.B.M

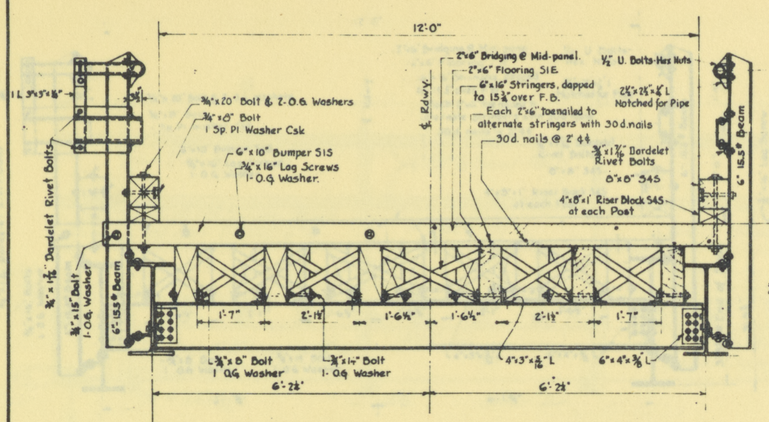
Designed A. E. Hall
Traced L. H. Camp
Checked
Approved J. H. Thorne
Asst. Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1

TYPICAL I-BEAM SPAN

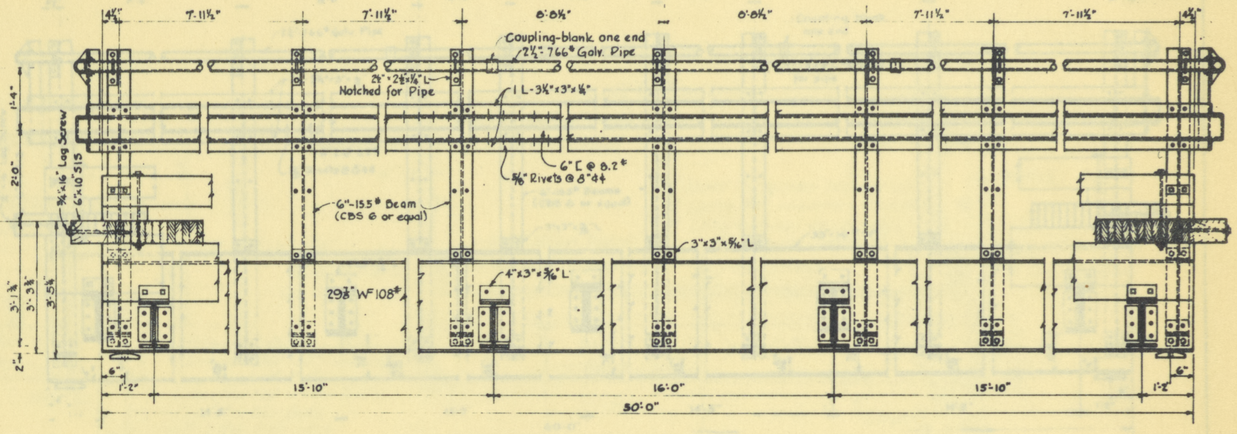
45'-0" SPAN 18'-0" ROADWAY
TIMBER FLOOR 15 TON LOADING
Scale as shown
Oct 1935 Sheet 1 of 1

DR. NO. 156



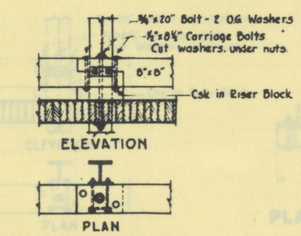
HALF END ELEVATION — HALF ROADWAY SECTION

Scale ¾" = 1'-0"



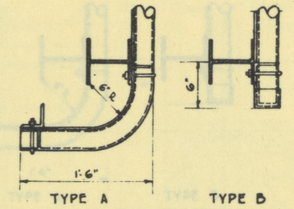
LONGITUDINAL SECTION

Scale ¾" = 1'-0"



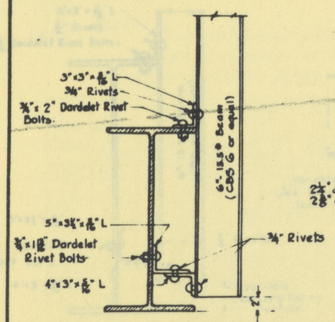
FELLOE GUARD SPLICE

Scale ¾" = 1'-0"



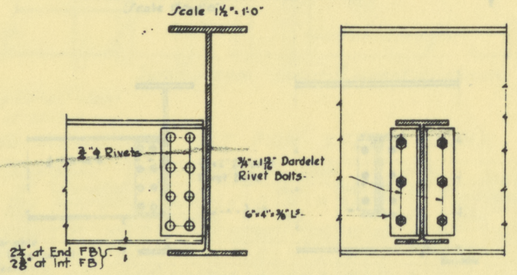
PLAN OF RAILING TERMINAL

Scale 1½" = 1'-0"



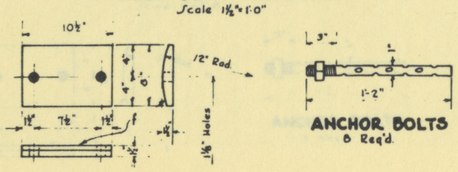
RAIL POST CONNECTION

Scale 1½" = 1'-0"



FLOOR BEAM CONNECTION

Scale 1½" = 1'-0"

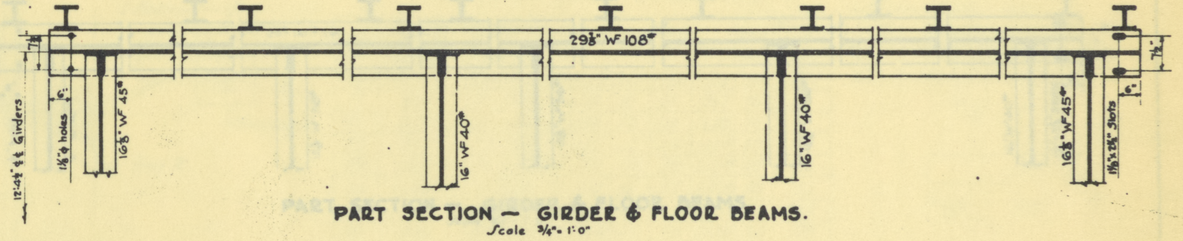


BEARING PLATES

Scale 1½" = 1'-0"

ANCHOR BOLTS

8 Req'd.



PART SECTION — GIRDER & FLOOR BEAMS.

Scale ¾" = 1'-0"

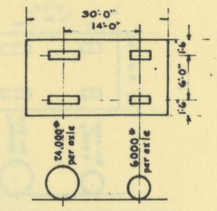
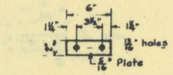


DIAGRAM- 15 TON TRUCK.



SPECIAL PLATE WASHER

Scale 1½" = 1'-0"

GENERAL NOTES

Loading: Dead Load - Timber, 60 lbs per cu. ft.
Live Load - One 15 ton Truck.
Impact: 30% on steel, none on timber.
Federal Specifications for Structural Steel. QQ-S-711 Class A, or A.S.T.M. Spec's.
" " " Rivet Steel. QQ-S-711 Class C.
Rivets to be ¾" ϕ except for ⅞" ϕ in flanges of 6" [.
Field connections to be made with Dardelet Rivet Bolts.
Open holes to be subpunched and reamed to ⅛" in diameter.
Structural Steel to be given one shop coat of red lead paint, one field coat of red lead paint and one field coat of aluminum paint.
Shop plans must be approved by the Engineer before fabrication is started.
Timber: All lumber to be of Coast Region Douglas Fir graded in accordance with the Grading and Dressing Rules of the West Coast Lumbermen's Assn., dated July 1, 1934.
Timber shall be of the following grades:
Stringers - Dense Select Structural
Decking - Select Structural.
Other Timber No 1. Dimension.
Hardware: All hardware except nails shall be furnished with structural steel. Nails will be furnished by the U.S. Forest Service.

QUANTITIES

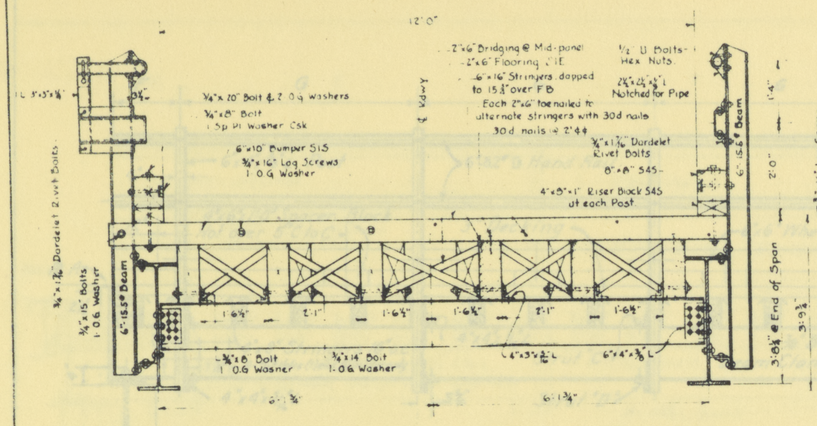
Structural Steel	19,400	Lbs.
Bolts & Washers	450	"
Timber	7.63	M.B.M.

Designed O.J. K-H
Traced D.H.M.
Checked W. Bertram
Approved C.E.J. Andrews
Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No. 1

TYPICAL I-BEAM SPAN

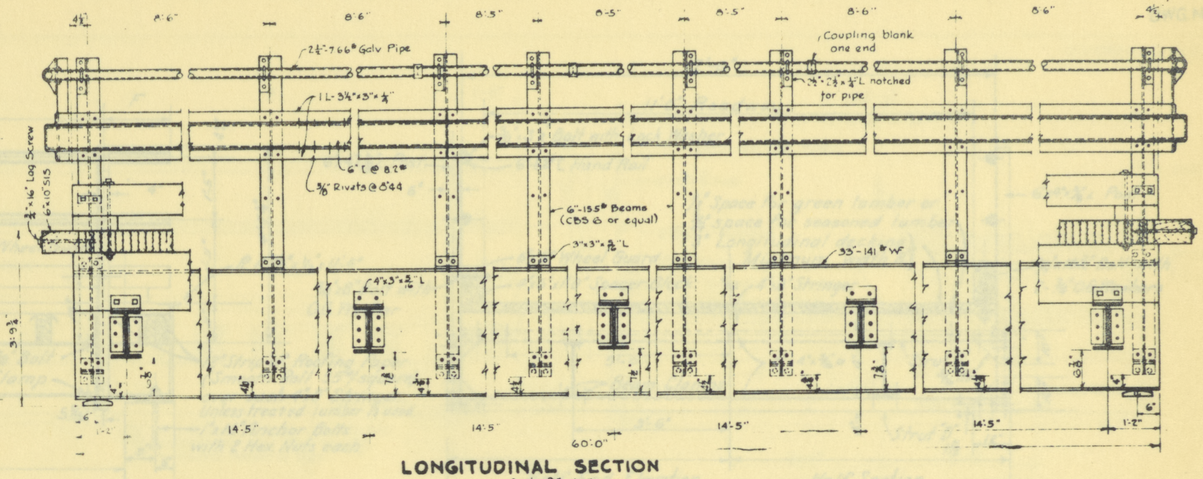
50'-0" SPAN 12'-0" ROADWAY
TIMBER FLOOR 15 TON LOADING
Scale as shown.
JUNE 1935 Sheet 1 of 1
Drg. No 114



HALF END ELEVATION

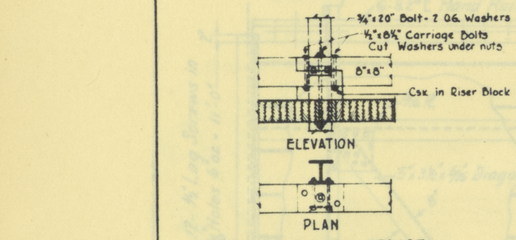
HALF ROADWAY SECTION

Scale ¾" = 1'-0"



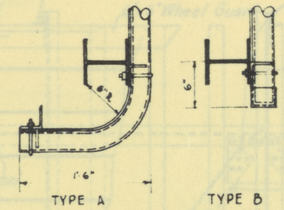
LONGITUDINAL SECTION

Scale ¾"=1'-0"



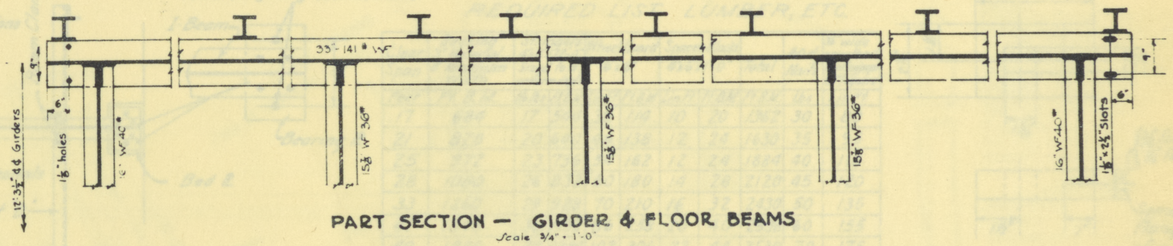
FELLOE GUARD SPLICE

Scale ¾"=1'-0"



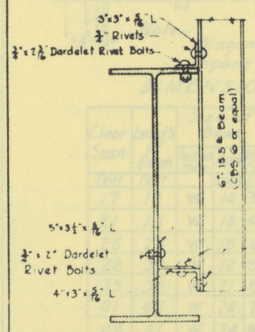
PLAN OF RAILING TERMINAL

Scale 1½"=1'-0"



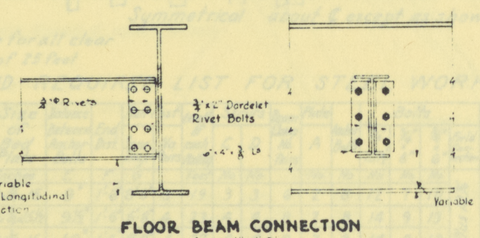
PART SECTION — GIRDER & FLOOR BEAMS

Scale ¾"=1'-0"



RAIL POST CONNECTION

Scale 1½"=1'-0"



FLOOR BEAM CONNECTION

Scale 1"=1'-0"

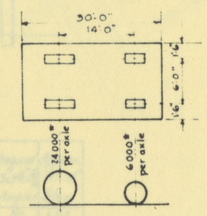
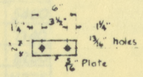
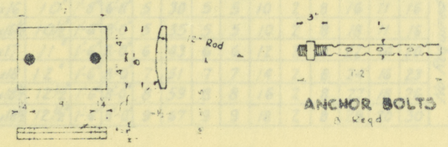


DIAGRAM-15 TON TRUCK



SPECIAL PLATE WASHER

Scale 1½"=1'-0"



BEARING PLATES

Scale ½"=1'-0"

ANCHOR BOLTS

N. Req'd

GENERAL NOTES

Loading: Dead Load - Timber 60 lbs per cu ft
Live Load - One 15 Ton Truck.
Impact - 30% on steel, none on timber.
Federal Specifications for Structural Steel QQ-S-711 Class A or A.S.T.M. Specs.
" " " Rivet Steel QQ-S-711 Class C.
Rivets to be ⅞" ⊕ except for ⅞" ⊕ in flanges of 6" I.
Field connections to be made with Dardelet Rivet Bolts.
Open holes to be subpunched and reamed to ⅞" in diameter.
Structural Steel to be given one shop coat of red lead paint, one field coat of red lead paint and one field coat of aluminum paint.
Shop plans must be approved by the Engineer before fabrication is started.
Timber: All lumber to be of Coast Region Douglas Fir graded in accordance with the Grading and Dressing Rules of the West Coast Lumbermens Assn., dated July 1 1934
Timber shall be of the following grades:
Stringers: Dense Select Structural
Decking: Select Structural
Other Timber: No 1 Dimension
Hardware: All hardware except nails shall be furnished with structural steel. Nails will be furnished by the U.S. Forest Service.

QUANTITIES

Structural Steel	25,800	Lbs
Bolts & Washers	325	"
Timber	9.00	M.B.M.

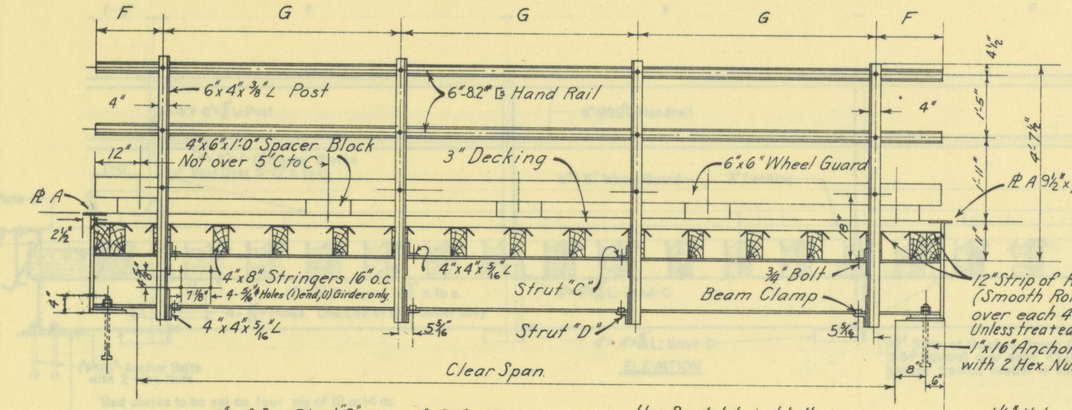
Designed J.Z. Kekk
Traced D.H.M.
Checked
Approved
for Regional Engineer

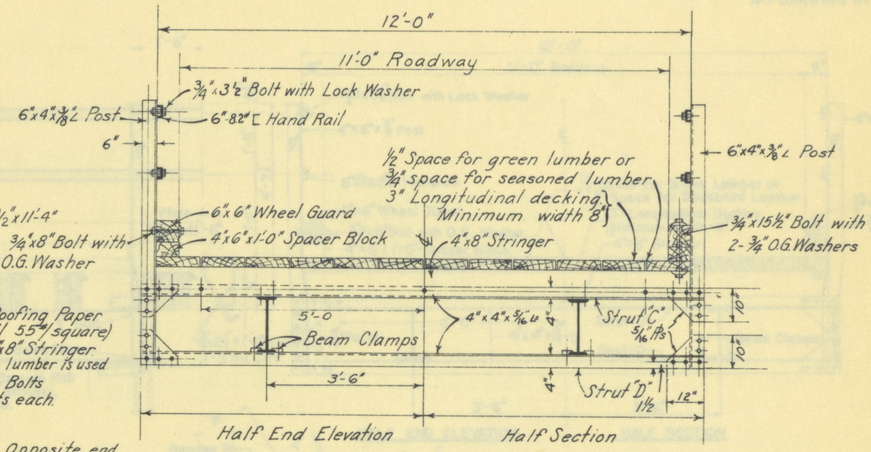
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No 1

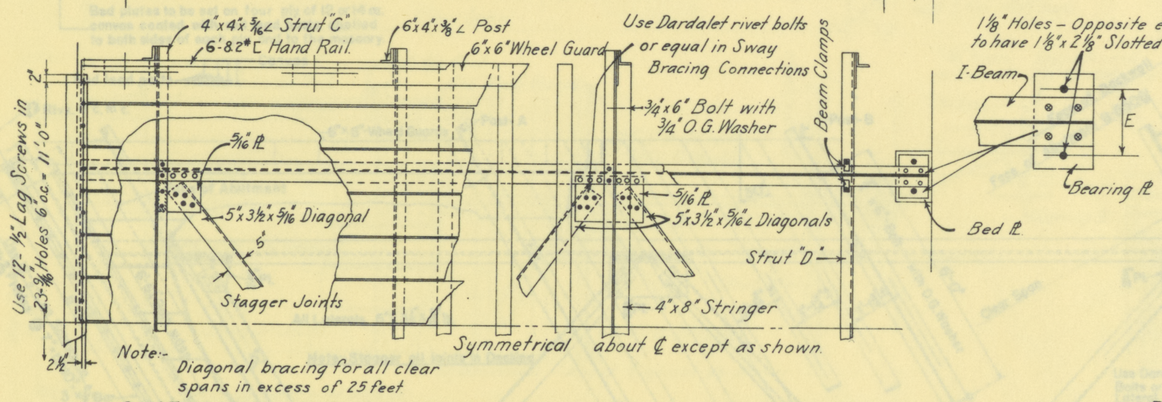
TYPICAL I-BEAM SPAN

60'-0" SPAN 12'-0" ROADWAY
TIMBER FLOOR 15 TON LOADING
Scale as shown
JUNE 1935 Sheet 1 of 1
Drg No 115.

DWG. No. B 7601

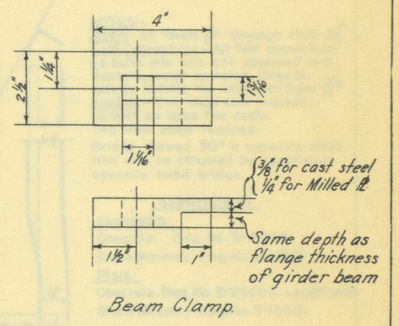






REQUIRED LIST LUMBER, ETC.

Clear Span	Decking 3" Material 8" Minimum Width	Stringers 4"x8"x12'-0" Sized to a uniform depth		Wheel Guard 6"x6"		Spacer Blocks 4"x6"x1'-0"		Total	60 d Nails	36" wide smooth roll roofing paper 55# / square
Feet	Ft. B.M.	No. Pcs	Ft. B.M.	Lin. Ft.	Ft. B.M.	Lin. Ft.	Ft. B.M.	Ft. B.M.	Lbs	Lin. Ft.
17	684	17	544	38	114	10	20	1362	30	80
21	828	20	640	46	138	12	24	1630	35	95
25	972	23	736	54	162	12	24	1884	40	110
28	1080	26	832	60	180	14	28	2120	45	120
33	1260	29	928	70	210	16	32	2430	50	135
41	1548	36	1152	86	258	20	40	2998	60	155
49	1836	42	1344	102	306	22	44	3530	70	175
57	2124	48	1536	118	354	26	52	4066	80	192
65	2412	54	1728	134	402	28	56	4598	90	216



DIMENSIONS AND REQUIRED LIST FOR STEEL WORK

Clear Span	Length of Beam	Size of Beam Section Index	Size of Beam Depth Inches	Size of Beam Wt. per Foot Lbs	Size of Bearing Plate Inches	Size of Bed Plate Inches	Distance Between Anchor Bolts E	End Dist. F	End Dist. G	Rail Post Spac. Ing.	Rail Post No. Pairs	Length of each Railing Feet	Struts C No.	Struts D No.	Beam Clamp No. Pairs	Plate A No.	Anchor Bolts No.	Bolts ⅞" x 15½" No.	Bolts ¾" x 8" No.	Bolts ¾" x 6" No.	Field Connection	O.G. Washers No.	Diagonal 5"x3½"x 5/16" Angles No.	Approx. Wt. of Steel Lbs
Feet	Feet		Inches	Lbs	Inches	Inches						Feet	No.	No.		No.	No.	No.	No.	No.				
17	19	WF	14	38	8x⅜x13	10x⅜x15	9"	1'-6"	8'-0"	3	19	3	3	6	2	8	12	7	10	10%	41	—	3700
21	23	WF	16	40	8x¾x13½	10x¾x15½	9½"	1'-6"	6'-8"	4	23	4	4	8	2	8	14	9	13		50	—	4640
25	27	WF	18	47	8x¾x14	10x¾x16	10"	1'-6"	8'-0"	4	27	4	4	8	2	8	14	9	13		50	—	5460
28	30	WF	18	55	8x¾x14	10x¾x16	10"	1'-8"	6'-8"	5	30	5	5	10	2	8	16	11	16		59	4	7140
33	35	WF	21	59	8x¾x14½	10x¾x16½	10½"	1'-6"	8'-0"	5	35	5	5	10	2	8	18	11	16		63	4	8200
41	43	WF	24	74	8x¾x15	10x¾x17	11"	1'-6"	8'-0"	6	43	6	6	12	2	8	22	14	20		78	5	11275
49	51	WF	24	87	8x¾x16	10x¾x18	12"	1'-6"	8'-0"	7	51	7	7	14	2	8	24	16	23		87	6	14600
57	59	WF	27	91	8x¾x16½	10x¾x18½	12½"	1'-6"	8'-0"	8	59	8	8	16	2	8	27	18	26		98	7	17230
65	67	WF	30	108	8x¾x16½	10x¾x18½	12½"	1'-6"	8'-0"	9	67	9	9	18	2	8	29	20	30		108	8	21900

No Required Plus 10%

RIVETS: All rivets ¾" ϕ – Minimum pitch 2½"

FIELD CONNECTIONS: All field connections ¾" bolts with nuts and approved lock washers, except as noted, threads entirely outside the hole. Open holes 13/16" ϕ

PAINTING: One (1) shop coat required, contact surfaces two (2) coats.
Two (2) field coats required.

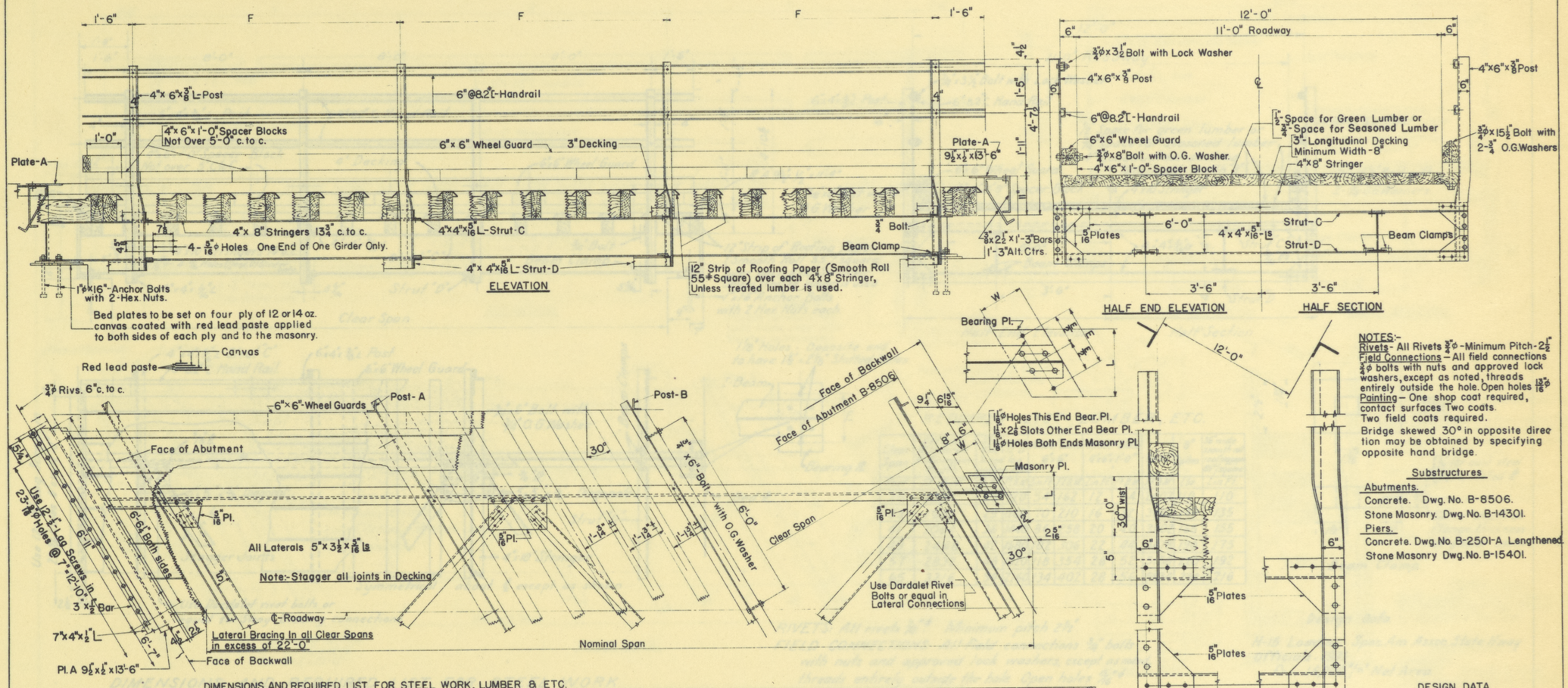
Design Data

H-10 Loading - Spec. Am. Assoc. State Hway Officials - 1931
fs = 16,000 #/□" Net Area.

Revised June 22, 1936 J.C.D.
Revised Dec 1935 R.H.B.
Revised June 1934 LTS.
Revised Feb 1932 W.I.D.
Revised Sept 1931 M.E.G.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
BEAM BRIDGE GIRDER TYPE
TIMBER DECK 11 FT ROADWAY
17 TO 65 FT SPANS

DESIGNED J.C.D. & R.E.P. DRAWN W.I.D.
CHECKED R.E.P. TRACED W.I.D.
APPROVED _____ DATE FEB. 1930.
Reg. Eng.



NOTES:-
Rivets- All Rivets 3/4"ø-Minimum Pitch-2 1/2"
Field Connections- All field connections 3/4"ø bolts with nuts and approved lock washers, except as noted, threads entirely outside the hole. Open holes 13/16"ø
Painting- One shop coat required, contact surfaces Two coats.
Two field coats required.
Bridge skewed 30° in opposite direction may be obtained by specifying opposite hand bridge.

Substructures

Abutments.
Concrete. Dwg. No. B-8506.
Stone Masonry. Dwg. No. B-14301.

Piers.
Concrete. Dwg. No. B-2501-A Lengthened.
Stone Masonry Dwg. No. B-15401.

DESIGN DATA
H-10 LOADING- Spec. Am. Asso. State H'way. Officials-1931.
f_s = 16,000#/a" Net Area.

DIMENSIONS AND REQUIRED LIST FOR STEEL WORK, LUMBER & ETC.

Equiv. Straight Span.	Clear Span	Nominal Span	Length of Beam	Size of Beam: Group	Size of Beam: Depth	Size of Beam: Wt. per Foot	Size of Bear. Pl. W x L.	Size of Bed Pl. W x L.	Dist. Between Anchor Bolts E	Rail Posts: Spacing F	Rail Posts: No. A	Rail Posts: No. B	Lgth. of Each Rail	No. of Struts C	No. of Struts D	No. of Beam Clamps	Pl. A x 13'-6" No.	Anc. Bolts No.	Bolts: 5/16"øx15" No.	Bolts: 3/4"øx8" No.	Bolts: 3/4"øx6" No.	Bolts: Field Connections No.	O.G. Washers No.	Diag. 5/16"x3 1/2" ls No.	Approx. Wt. of Steel lbs.	Decking 3"-Thk. 8"-Min. Width M.B.M.	Stringers 4"x8"x14'-0" Sized to a Unif. Depth. No. pcs.	Stringers 4"x8"x14'-0" Sized to a Unif. Depth. M.B.M.	Wheel G'ds. 6"x6" Lin. ft.	Wheel G'ds. 6"x6" M.B.M.	Spac. Blocks 4"x6"x1'-0" Lin. ft.	Spac. Blocks 4"x6"x1'-0" M.B.M.	Total. M.B.M.	60 d. spikes lbs.	36" Wide smooth Roof paper 55#/sq. Lin. ft.	1/2"x7" Lag Screws No.
Feet	Feet	Feet	Feet	S'mbl	Inches	lbs.	Inches	Inches	E	No.	No.	No.	Feet	C	D	No.	No.	No.	No.	No.	No.	No.	No.	No.	lbs.	M.B.M.	No.	M.B.M.	Lin ft.	M.B.M.	Lin ft.	M.B.M.	M.B.M.	lbs.	Lin ft.	No.
17'-0"	14'-6 1/2"	16'-9 1/2"	19'-1 1/2"	WF	14	38	8x3/4x13	10x3/4x15	10 1/2"	2	2	8'-0"	3	3	19'-0"	3	3	12	2	8	12	7	10	10%	41	—	4,750	.68	17	.64	38	.11	10	.02	1.45	35	90	24
21'-0"	18'-0 1/2"	20'-9 1/2"	23'-1 1/2"	WF	16	40	8x3/4x13 1/2	10x3/4x15 1/2	11"	2	2	6'-8"	4	4	23'-0"	4	4	16	2	8	14	9	13		50	—	5,650	.83	20	.75	46	.14	12	.02	1.74	40	105	24
25'-0"	21'-5 3/4"	24'-9 1/2"	27'-1 1/2"	WF	18	47	8x3/4x14	10x3/4x16	11 1/2"	2	2	8'-0"	4	4	27'-0"	4	4	16	2	8	14	9	13		50	—	6,500	.97	23	.86	54	.16	12	.02	2.01	45	120	24
28'-0"	24'-0 3/4"	27'-9 1/2"	30'-1 1/2"	WF	18	55	8x3/4x14	10x3/4x16	11 1/2"	2	2	6'-9"	5	5	30'-0"	5	5	20	2	8	16	11	16		59	5	8,300	1.10	26	.97	60	.18	14	.03	2.28	50	135	24
33'-0"	28'-4 3/4"	32'-9 1/2"	35'-1 1/2"	WF	21	59	8x3/4x14 1/2	10x3/4x16 1/2	1'-0"	2	2	8'-0"	5	5	35'-0"	5	5	20	2	8	18	11	16		63	5	9,350	1.26	29	1.08	70	.21	16	.03	2.58	60	150	24
41'-0"	35'-4"	40'-9 1/2"	43'-1 1/2"	WF	24	74	8x3/4x15	10x3/4x17	1'-1"	2	2	8'-0"	6	6	43'-0"	6	6	24	2	8	22	14	20		78	7	12,400	1.55	35	1.31	86	.26	20	.04	3.16	70	180	24
49'-0"	42'-3"	48'-9 1/2"	51'-1 1/2"	WF	24	87	8x3/4x16	10x3/4x18	1'-2"	2	2	8'-0"	7	7	51'-0"	7	7	28	2	8	24	16	23		87	7	15,750	1.84	41	1.53	102	.31	22	.04	3.72	80	215	24
57'-0"	49'-2 1/4"	56'-9 1/2"	59'-1 1/2"	WF	27	91	8x3/4x16 1/2	10x3/4x18 1/2	1'-2 1/2"	2	2	8'-0"	8	8	59'-0"	8	8	32	2	8	27	18	26		98	9	18,450	2.12	47	1.76	118	.35	26	.05	4.23	90	245	24
65'-0"	56'-1 5/8"	64'-9 1/2"	67'-1 1/2"	WF	30	108	8x3/4x16 1/2	10x3/4x18 1/2	1'-2 1/2"	2	2	8'-0"	9	9	67'-0"	9	9	36	2	8	29	20	30		108	9	23,000	2.41	53	1.98	134	.40	28	.06	4.85	100	275	24

No. Req'd. + 10%

These items and anchor bars not included on bridge requisitions- See Abutment Dwg.

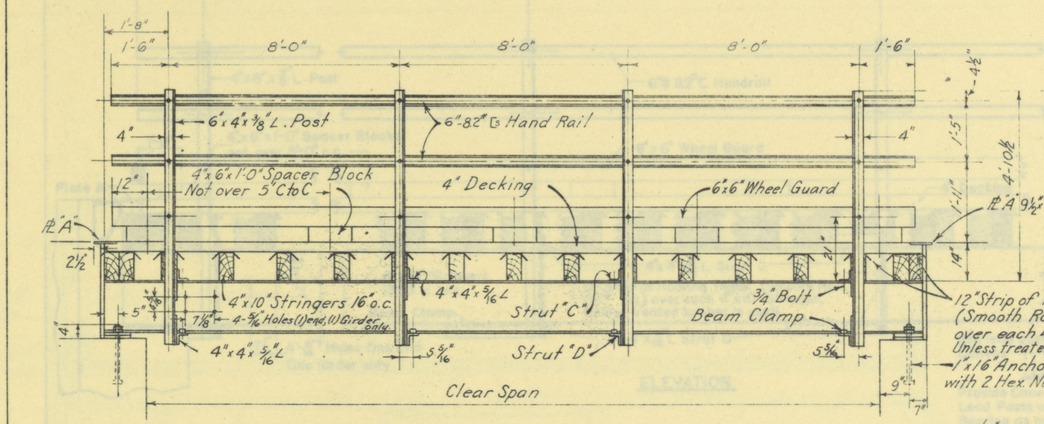
REVISED DEC. 5-1935
REVISED NOV. 5-1935

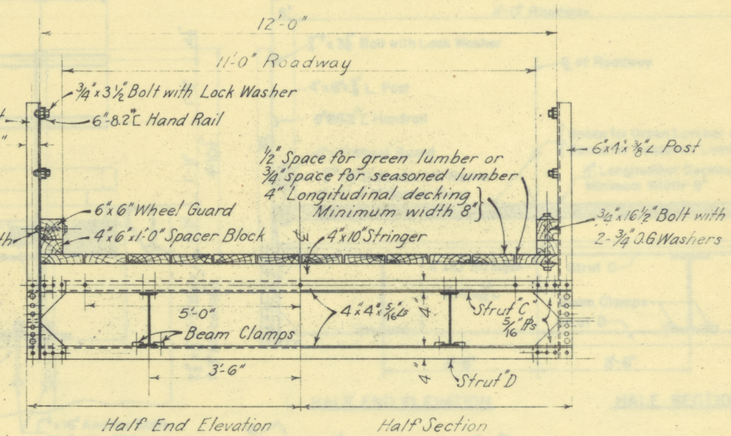
Revised June 22-1936 A.M.G.
Revised May 22-1936

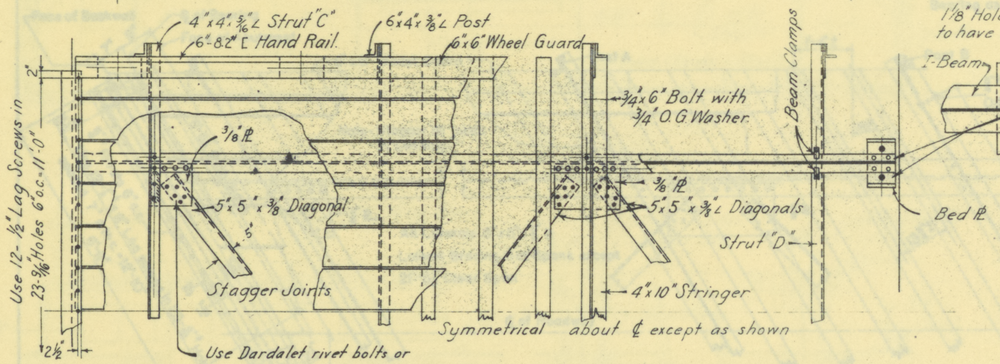
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BEAM BRIDGE-GIRDER TYPE-SKEWED 30°
TIMBER DECK-11'-ROADWAY
NOMINAL SPANS-16'-9 1/2" TO 64'-9 1/2"
CLEAR SPANS-14'-6 1/2" TO 56'-1 5/8"

DESIGNED MODIFICATION OF B-7601 DRAWN L.T.S.
CHECKED TRACED L.T.S.
RECOMMENDED FOR APPROVAL DATE JUNE, 1935.
APPROVED REGIONAL ENGINEER

Dwg. No. B1G01

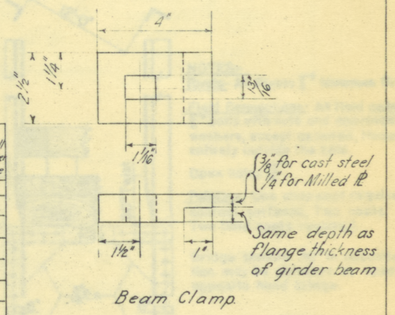






REQUIRED LIST LUMBER, ETC.

Clear Span	Decking 4" Material 8" Minimum Width	Stringers 4"x10"x12'-0" Sized to a uniform depth	Wheel Guard 6"x6"	Spacer Blocks 4"x6"x1'-0"	Total	8" Spikes	36" wide smooth roll roofing paper 55# square
Feet	Ft. B.M.	No. Pcs.	Ft. B.M.	Lin. Ft.	Ft. B.M.	Lin. Ft.	Ft. B.M.	Lbs.	Lin. Ft.
25	1296	23	920	54	162	12	24	2402	110	110
33	1680	29	1160	70	210	16	32	3082	140	135
41	2064	36	1440	86	258	20	40	3802	165	155
49	2448	42	1680	102	306	22	44	4478	190	175
57	2832	48	1920	118	354	26	52	5158	220	192
65	3216	54	2160	134	402	28	56	5834	250	216



Beam Clamp

DIMENSIONS AND REQUIRED LIST FOR STEEL WORK

Clear Span	Length of Beam	Size of Beam: Section Index	Size of Beam: Depth Inches	Size of Beam: Wt per Foot Lbs	Size of Bearing Plate Inches	Size of Bed Plate Inches	Distance Between Anchor Bolts E	Rail Post No. Pairs	Length of each Railing Feet	Struts: C No.	Struts: D No.	Beam Clamp No. Pairs	Plate A No.	Anchor Bolts No.	Bolts: 3/4" x 16 1/2" No.	Bolts: 3/4" x 8" No.	Bolts: 3/4" x 6" No.	Field Connection	O.G. Washers No.	Diagonal 5"x5"x3/8" Angles No.	Approx. Wt. of Steel Lbs.
Feet	Feet		Inches	Lbs	Inches	Inches			Feet	No.	No.		No.	No.	No.	No.	No.		No.	No.	
25	27'-4"	WF	21	63	10"x3/4"x14 1/2"	10"x3/4"x16 1/2"	10 1/2"	4	27	4	4	8	2	8	14	9	13		50	—	6,450
33	35'-4"	WF	27	91	10"x3/4"x16 1/2"	10"x3/4"x18 1/2"	12 1/2"	5	35	5	5	10	2	8	18	11	16		63	4	10,720
41	43'-4"	WF	30	108	10"x3/4"x17	10"x3/4"x19	13"	6	43	6	6	12	2	8	22	14	20		78	5	14,350
49	51'-4"	WF	33	125	10"x3/4"x18	10"x3/4"x20	14"	7	51	7	7	14	2	8	24	16	23		87	6	18,950
57	59'-4"	WF	36	150	10"x3/4"x18 1/2"	10"x3/4"x20 1/2"	14 1/2"	8	59	8	8	16	2	8	27	18	26		98	7	24,720
65	67'-4"	WF	36	170	10"x3/4"x18 1/2"	10"x3/4"x20 1/2"	14 1/2"	9	67	9	9	18	2	8	29	20	30		108	8	30,720

Field Connection: No. Required + 10 %

RIVETS: All rivets 3/4" ϕ Minimum pitch 2 1/2"
FIELD CONNECTIONS: All field connections 3/4" bolts with nuts and approved lock washers, except as noted, threads entirely outside the hole. Open holes 13/16" ϕ
PAINTING: One (1) shop coat required, contact surfaces two (2) coats
Two (2) field coats required.

Design Data

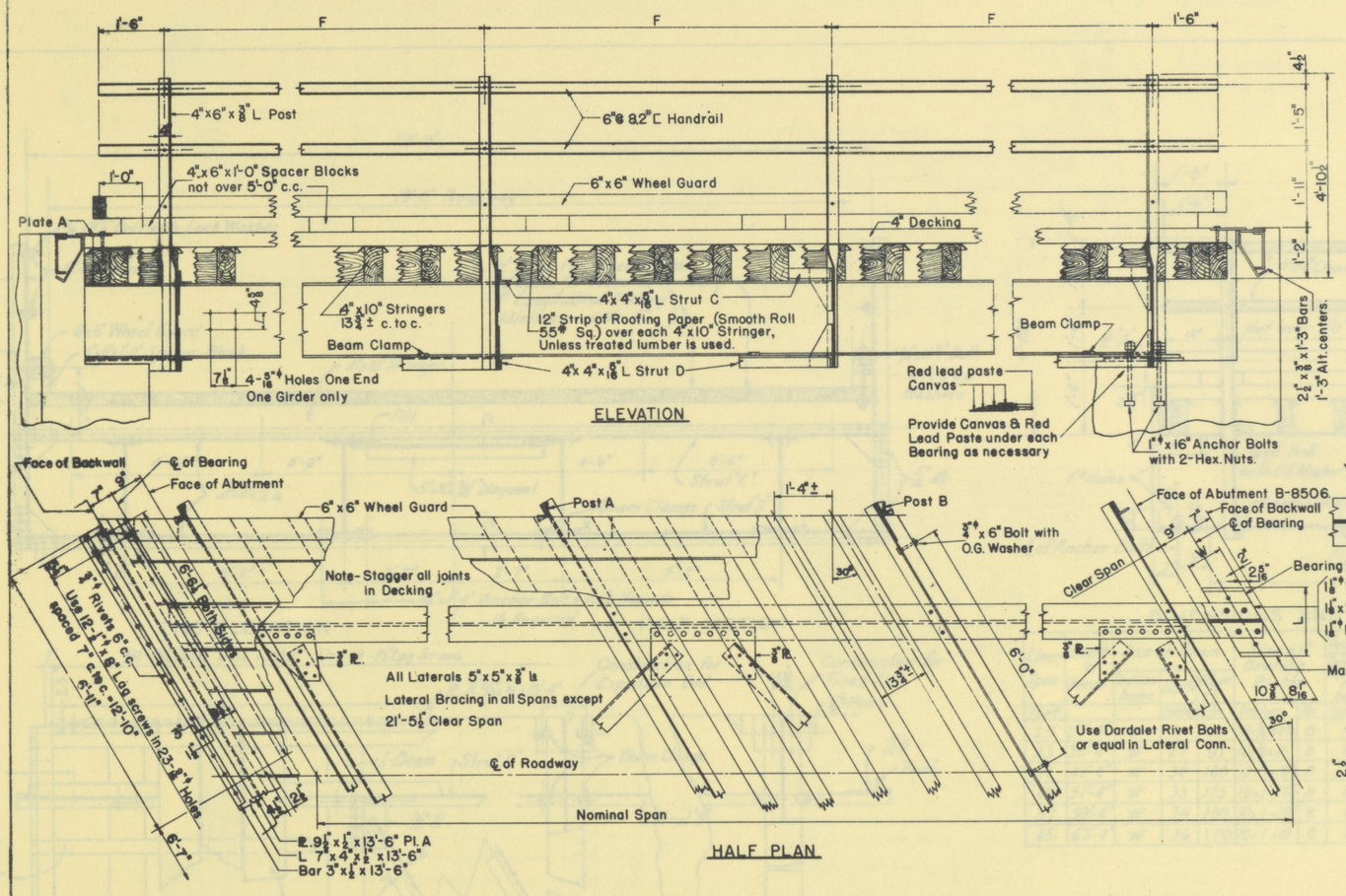
H-15 Loading - Spec. Am. Assoc. State Hiway Officials - 1931
fs = 16,000 #/□" Net Area.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
BEAM BRIDGE - GIRDER TYPE
TIMBER DECK - 11 FT. ROADWAY
25 TO 65 FT. SPANS

DESIGNED J.C.D & R.E.P. DRAWN W.I.D
CHECKED D.B. TRACED W.I.D
APPROVED J.C.Dort Regional Eng. DATE March 1933.
Revised June 1934 - L.T.S.
Revised Dec. 1935 A.H.B

Revised June 22, 1936 J.C.S.

R-7-DRAWING № B-6601



NOTES:-

Rivets- All Rivets ¾"@ Minimum Pitch- 2½"

Field Connections- All field connections ¾"@ bolts with nuts and approved lock washers, except as noted, threads to be entirely outside the hole.

Open holes 13/16"@

Painting- One shop coat required, contact surfaces, Two coats. Two field coats required.

Bridge skewed 30° in opposite direction may be obtained by specifying opposite hand bridge.

DESIGN DATA

H-15 Loading- Specifications of Am. Assn. State H'way Officials - 1931
f_s = 16,000#/□" Net Area.

Substructures.

Abutments
Concrete Dwg. No. B-8506
Stone Masonry Dwg. No. B-14301

Piers.
Concrete Dwg. No. B-2501-A Lengthened.
Stone Masonry. Dwg. No. B-1540.

Revised: June 20, 1936 AHB

DIMENSIONS AND REQUIRED LIST FOR STEEL WORK, LUMBER, AND MISCELLANEOUS MATERIAL

Span Excluded Straight	Span Clear	Span Nominal	Length of Beam	Size of Beam Group Symbol	Size of Beam Depth Inches	Size of Beam Weight Per Ft. lbs.	Size of Bearing Plate W. x L.	Size of Bed Plate W. x L.	Dist. Between Anchor Bolts.	7"x4"x⅜"L 13'-6" Long	3"x½" Pl. 13'-6" Long	Rail Posts Spacing	Rail Posts No.	Rail Posts No.	Length of Each Rail	Number of Struts		Beam Clamps	Pl. A 9½"x½" 13'-6" Long.	Anc. Bolts ⅞"@ x16"	Bolts ¾"@ x16½"	Bolts ¾"@ x8"	Bolts ¾"@ x6"	Bolts Field Connections	O.G. Washers	Diagonals 5"x5"x⅜" ℓs	Approx. Wt. of Steel	Decking 4½" Thk. 8" Min. Width	Stringers 4"x10"x14'-0" Sized to a Unif. Depth.	Wheel G'ds. 6"x6"		Spac. Blocks 4"x6"x1'-0"		Total.	8" Spikes	36" Wide Roof Paper 55#/Sq.	½"@ x8" Lag Screws.
Feet	Feet	Feet	Feet		Inches		Inches	Inches	E	No.	No.	F	A	B	Feet	C	D	No.	No.	No.	No.	No.	No.		No.	No.	lbs.	Ft. B.M.	No.	Ft. B.M.	Lin.Ft.	Ft. B.M.	Lin.Ft.	Ft. B.M.	Ft. B.M.	lbs.	Lin.Ft.	No.
25'-0"	21'-5½"	24'-9¼"	27'-5½"	WF	21"	63	10x¾x14½	10x¾x16½	1'-0½"	2	2	8'-0"	4	4	27'-0"	4	4	16	2	8	14	9	13		50	—	7,450	1,440	23	1,074	54	162	12	24	2,700	110	120	24
33'-0"	28'-4½"	32'-9¼"	35'-5½"	WF	27"	91	10x¾x16½	10x¾x18½	1'-3"	2	2	8'-0"	5	5	35'-0"	5	5	20	2	8	18	11	16		63	5	11,950	1,824	29	1,354	70	210	16	32	3,420	140	150	24
41'-0"	36'-3⅜"	40'-9¼"	43'-5½"	WF	30"	108	10x¾x17	10x¾x19	1'-3½"	2	2	8'-0"	6	6	43'-0"	6	6	24	2	8	22	14	20		78	7	15,550	2,208	35	1,634	86	258	20	40	4,140	165	180	24
49'-0"	42'-2⅜"	48'-9¼"	51'-5½"	WF	33"	125	10x¾x18	10x¾x20	1'-5"	2	2	8'-0"	7	7	51'-0"	7	7	28	2	8	24	16	23		82	7	20,150	2,592	41	1,914	102	306	22	44	4,856	190	215	24
57'-0"	49'-2"	56'-9¼"	59'-5½"	WF	36"	150	10x¾x18½	10x¾x20½	1'-5½"	2	2	8'-0"	8	8	59'-0"	8	8	32	2	8	27	18	26	No. Reqd. + 10 %	98	9	26,000	2,976	47	2,194	118	354	26	52	5,576	220	245	24
65'-0"	56'-1"	64'-9¼"	67'-5½"	WF	36"	170	10x¾x18½	10x¾x20½	1'-5½"	2	2	8'-0"	9	9	67'-0"	9	9	36	2	8	29	20	30		108	9	31,950	3,408	53	2,474	134	402	28	56	6,340	250	275	24

These items and anchor bars not included on bridge requisitions-- See Abutment Dwg.

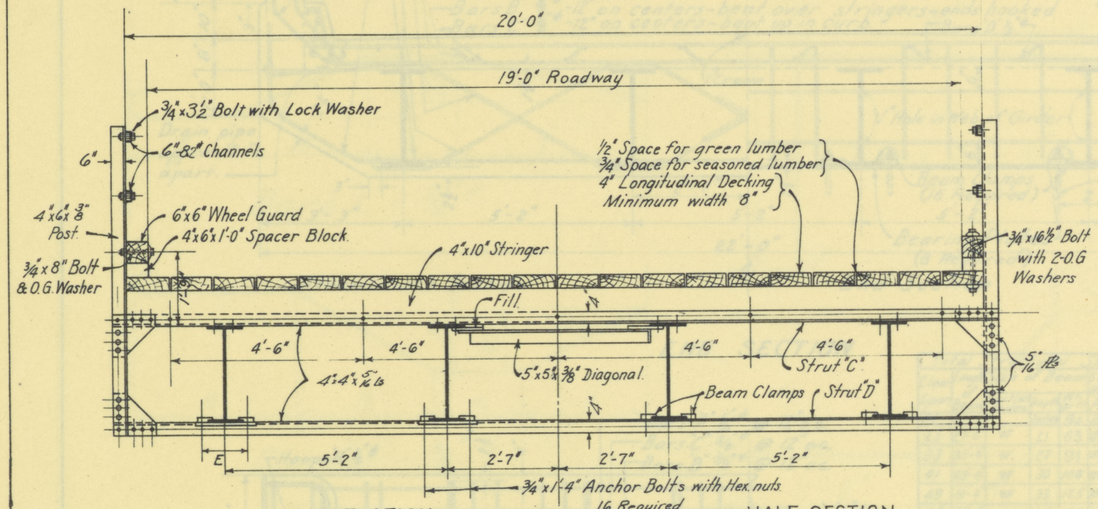
REVISED MAY 22-1936
REVISED DEC. 11-1935

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BEAM BRIDGE- GIRDER TYPE- SKEWED 30°
TIMBER DECK - 11'-ROADWAY
NOMINAL SPANS- 24'-9¼" TO 64'-9¼"
CLEAR SPANS- 21'-5½" TO 56'-1"

DESIGNED MODIFICATION OF B-1601 CCJ. DRAWN C. C. J.
CHECKED MWW TRACED A. H. B.
RECOMMENDED FOR APPROVAL E. E. Mc DATE OCTOBER-1936
APPROVED

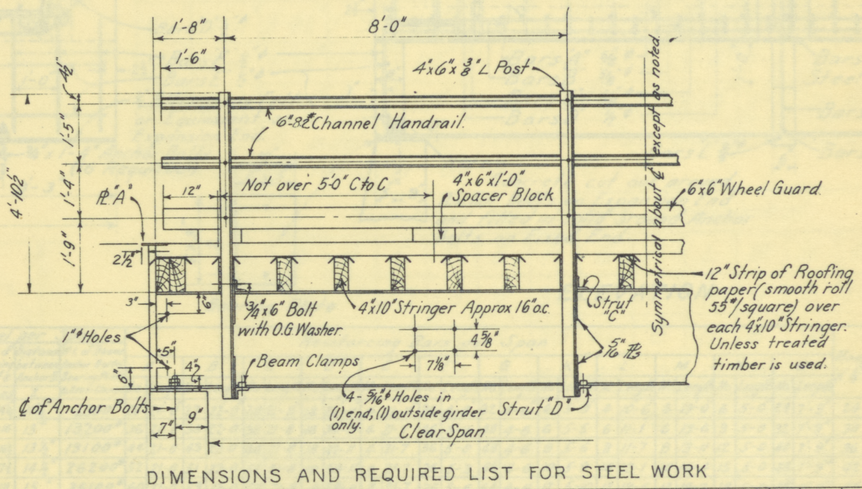
Dwg. No B-1701.



END ELEVATION

HALF SECTION

RIVETS: All rivets 3/4" ϕ Minimum pitch 2 1/2"
FIELD CONNECTIONS: All field connections 3/4" Bolts with nuts and approved lock washers, except as noted, with threads entirely outside the hole. Open holes 13/16" ϕ
PAINTING: One (1) shop coat required, contact surfaces two (2) coats.
Two (2) field coats required



DIMENSIONS AND REQUIRED LIST FOR STEEL WORK

Clear Span	Length of Beam	Size of Beam Section Index	Size of Beam Depth	Size of Beam Wt per ft.	Size of Bearing Plates	No	Anchor Bolts Distance E Expansion End Only.	Anchor Bolts 3/4"x 1'-4"	Length of each Pailing	Struts C	Struts D	Beam Clamp	Plate A	Rail Posts	Bolts 3/4"x 16 1/2"	Bolts 3/4"x 8"	Bolts 3/4"x 6"	Bolts Field Connection	No. Required + 10%	3/4" O.G. Washers	Diagonal 5"x5"x 3/8"	Approx Total Wt
Feet			Inches	Lbs.	Inches	No	Inches	No	Feet	No	No	Pairs	No	Pairs	No	No	No			No	No	Lbs.
25	27'-4"	WF	21	63	10x3/4x14 1/2	8	11 1/4	16	27	4	4	20	2	4	14	9	22		59	—	10600
33	35'-4"	WF	27	91	10x3/4x16	8	13	16	35	5	5	24	2	5	18	11	27		74	4	17,950
41	43'-4"	WF	30	108	10x3/4x16 1/2	8	13 1/2	16	43	6	6	28	2	6	22	14	33		91	5	24,900
49	51'-4"	WF	33	125	10x1 x17 1/2	8	14 1/2	16	51	7	7	32	2	7	24	16	38		102	6	33,000
57	59'-4"	WF	36	150	10x1 x18	8	15	16	59	8	8	36	2	8	27	18	43		115	7	43900
65	67'-4"	WF	36	170	10x1 x18	8	15	16	67	9	9	40	2	9	29	20	50		128	8	55,050

REQUIRED LIST - LUMBER, ETC.

Clear Span	Decking 4" Material 8" Minimum width	Stringers* 4"x10" 20'-0" Except to a Uniform depth	Wheel Guard 6"x6"		Spacer Block 4"x6"x1'-0"		Total	8" Spikes	36" wide smooth roll roofing paper 55#/square
Feet	Ft. B.M	No	Lin. Ft.	Ft. B.M	Lin. Ft.	Ft. B.M	Ft. B.M	Lbs	Lin. Ft.
25	2187	23	1533	54	162	12	24	3906	180	160
33	2827	29	1933	70	210	16	32	5002	230	200
41	3467	36	2400	86	258	20	40	6165	275	240
49	4107	42	2800	102	306	22	44	7257	320	280
57	4747	48	3200	118	354	26	52	8353	365	320
65	5387	54	3600	134	402	28	56	9445	415	360

* Not to be spliced

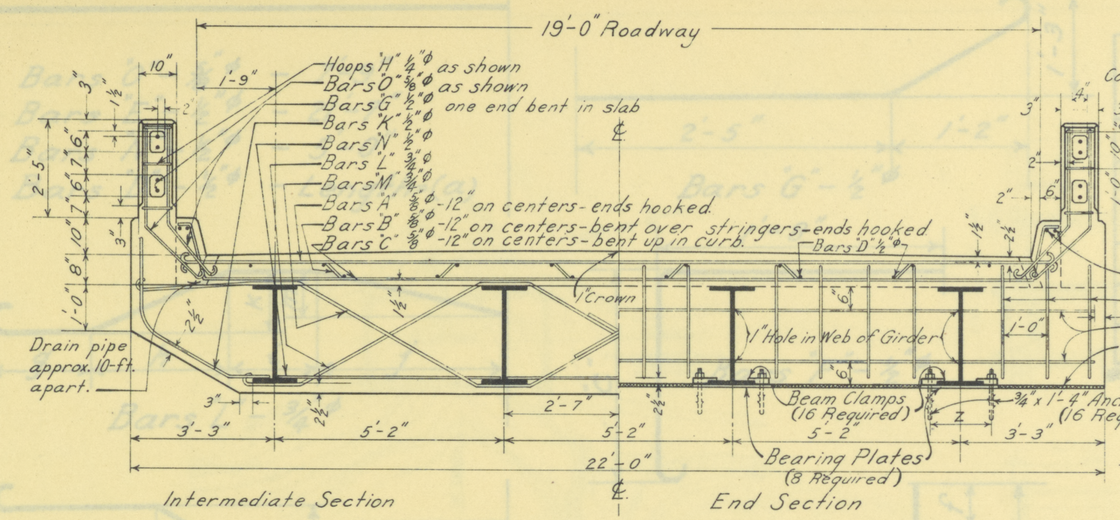
Design Data
H-15 Loading - Spec. Am. Assoc. State H'way Officials 1931
f_s = 16,000 #/□" Net Area.

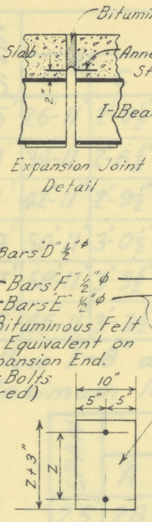
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7

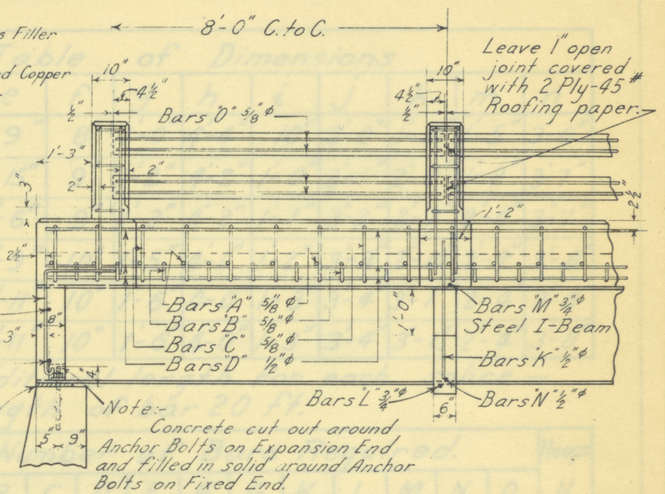
BEAM BRIDGE GIRDER TYPE TIMBER DECK 19 FT ROADWAY 25 TO 65 FT SPANS

DESIGNED REB & DB — DRAWN W.I.D
CHECKED — TRACED W.I.D
APPROVED — Reg. Eng — DATE. March 1933
Revised June 1934 L.T.S.
Revised. June 22, 1936 A.H.B. — Revised Dec. 1935 A.H.B.

DWG. NO. B-2201

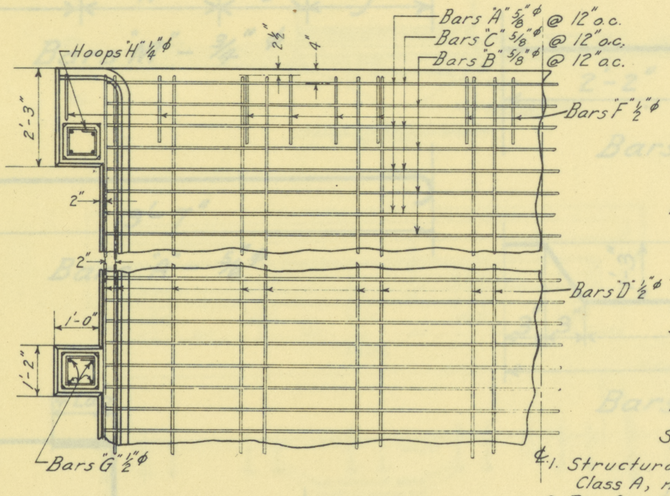






END SECTION

ELEVATION



PARTIAL PLAN VIEW
(Showing Reinforcing Steel in Slab)

Total Structural Steel per Span									Reinforcing Bars per Span																						Hoops H ¼"ϕ	Wt. of Reinforcing Steel.
Clear Span Ft.	Length of Beam	Size of Beam Section Index	Size of Beam Depth Inches	Size of Beam Wt. per Ft. lbs.	Size of Bearing Plate inches	Distance between Anchor Bolts & Beam Clamps Z	Wt. of Beams Anchor Bolts Bearing Plate & Beam Clamps	A No.	A Length	B No.	B Length	C No.	C Length	D* No.	D* Length	E No.	E Length	F No.	F Length	G No.	G Length	K No.	K Length	L No.	L Length	M No.	M Length	N No.	N Length	O No.	O Length		
25	27'-4"	WF	21	63	10"x8½"x1⅛"	11¼"	7300#	28	21'-0"	27	22'-0"	28	21'-8"	18	26'-11"	4	21'-7"	36	4'-3"	32	4'-6"	4	5'-3"	4	10'-6"	4	13'-0"	6	5'-0"	24	7'-9"	24	2820#
33	35'-4"	WF	27	91	10"x⅞"x16"	13"	13,200#	36	21'-0"	35	22'-0"	36	21'-8"	18	34'-11"	4	21'-7"	36	4'-9"	40	4'-6"	6	5'-5"	6	11'-1"	6	13'-6"	9	5'-0"	32	7'-9"	30	3650#
41	43'-4"	WF	30	108	10"x⅞"x16½"	13½"	19100#	44	21'-0"	43	22'-0"	44	21'-8"	18	42'-11"	4	21'-7"	36	5'-0"	48	4'-6"	8	5'-6"	8	11'-7"	8	13'-11"	12	5'-0"	40	7'-9"	36	4480#
49	51'-4"	WF	33	125	10"x1"x17½"	14½"	26200#	52	21'-0"	51	22'-0"	52	21'-8"	18	50'-11"	4	21'-7"	36	5'-3"	56	4'-6"	10	5'-9"	10	12'-1"	10	14'-4"	15	5'-0"	48	7'-9"	42	5310#
57	59'-4"	WF	36	150	10"x1"x18"	15"	36100#	60	21'-0"	59	22'-0"	60	21'-8"	18	58'-11"	4	21'-7"	36	5'-6"	64	4'-6"	12	5'-10"	12	12'-5"	12	14'-7"	18	5'-0"	56	7'-9"	48	6140#
65	67'-4"	WF	36	170	10"x1"x18"	15"	46,300#	68	21'-0"	67	22'-0"	68	21'-8"	18	66'-11"	4	21'-7"	36	5'-6"	72	4'-6"	14	5'-10"	14	12'-5"	14	14'-7"	21	5'-0"	64	7'-9"	54	6970#

*Allow 1'-8" additional length for each splice - Maximum length of bar 20-ft.

Notes:-

Use precast blocks or other approved means for holding reinforcing bars in place.

Chamfer all edges 1" as detailed.

All handrails shall be precast on edge. Set in post forms with rough edge down.

Use 3" drain pipe - Care shall be exercised to keep drain holes and immediate surrounding surface slightly depressed to insure proper drainage.

All concrete { Class A - 1½ for Slab and Posts. Class A - ½ for Handrail.

Lengths given for bars are total lengths before bending.

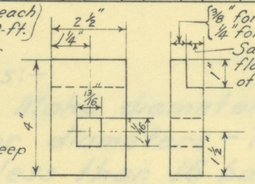
Specifications

1. Structural Steel F.S.Q.Q.-S-711 Class A, non-copper.
2. Reinforcing Bars - F.S.Q.Q.-B-71 Type B - Grade 1 (Deformed Structural) Class A (Open Hearth Steel) Hoops - Type A (Plain)
3. Concrete - See Notes.

Design Data

H-15 Loading
f_s = 16,000 #/in²
f_c = 800 #/in² - n=10
15 #/Sq.Ft. allowance for surfacing.

For Bending Diagram See Dwg. B-2202-A



Beam Clamp

Camber to compensate for deflection of girder.

Span	Camber at center of span
25	¼"
33	⅜"
41	½"
49	¾"
57	15/16"
65	1⅜"

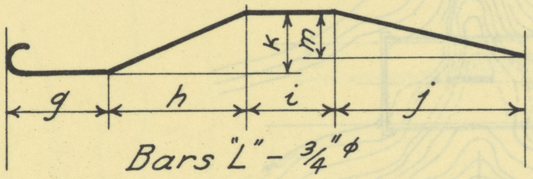
Span Feet	Concrete Cu yds.	Sand Cu yds.	Stone Cu yds.	Cement Bags
25	20.5	11	17	140
33	27.5	15	23	190
41	34.0	18	29	235
49	40.7	21	34	280
57	47.7	25	40	330
65	54.0	28	45	375

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-7
STEEL BEAM BRIDGES - GIRDER TYPE
CONCRETE DECKING — 19-FT. ROADWAY
25-FT. TO 65FT. SPANS

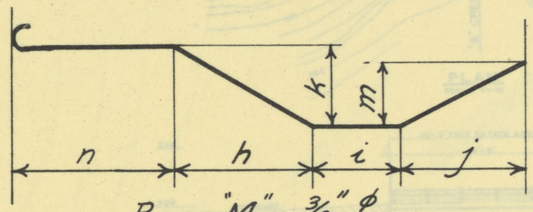
DESIGNED & CHECKED R.E.P. & D.B.
DRAWN M.E.G. TRACED M.E.G.
APPROVED [illegible] Regional Eng. DATE April 1932
Revised June 1934 L.J.S.

DWG. NO. B-2202-A

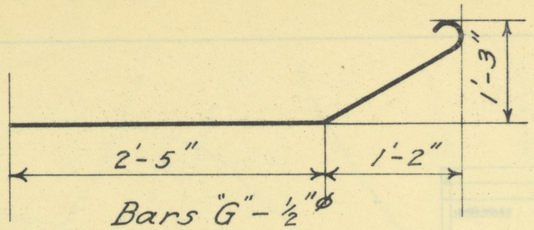
Bars "O" – 5/8"ϕ – 7'-9"
Bars "E" – 1/2"ϕ – 21'-7"
Bars "N" – 1/2"ϕ – 5'-0"
Bars "D" – 1/2"ϕ – Length=(a)



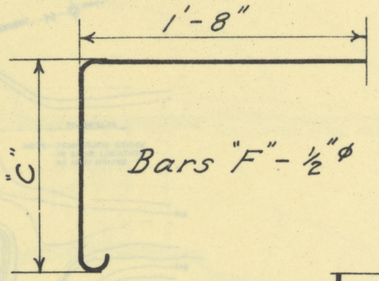
Bars "L" – 3/4"ϕ



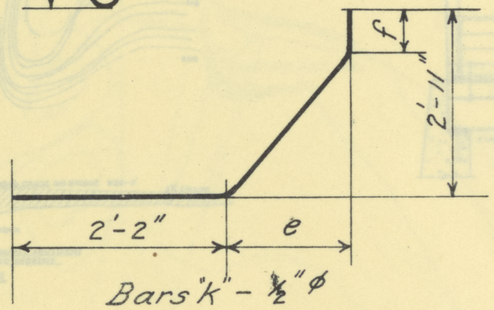
Bars "M" – 3/4"ϕ



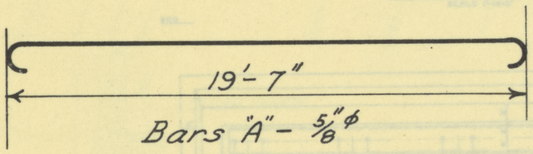
Bars "G" – 1/2"ϕ



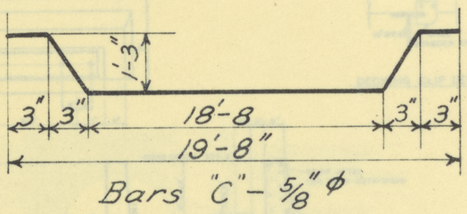
Bars "F" – 1/2"ϕ



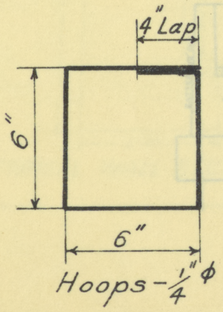
Bars "K" – 1/2"ϕ



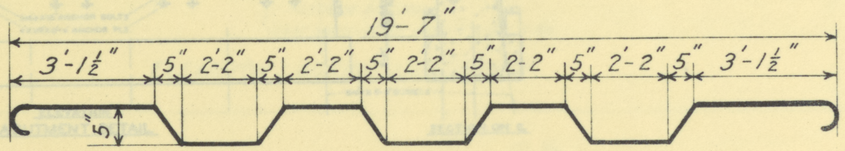
Bars "A" – 5/8"ϕ



Bars "C" – 5/8"ϕ



Hoops – 1/4"ϕ



Bars "B" – 5/8"ϕ

SPAN	Table of Dimensions										
	a*	c	e	f	g	h	i	j	k	m	n
25'	26'-11"	2'-0 1/2"	9"	8"	1'-0"	4'-4"	10"	3'-0"	1'-10"	1'-5"	3'-6"
33'	34'-11"	2'-6 1/2"	15"	9"	1'-2"	4'-2"	1'-0"	3'-1"	2'-4"	1'-8"	3'-7"
41'	42'-11"	2'-9 1/2"	1'-6"	9"	1'-3"	4'-2"	1'-1"	3'-2"	2'-7"	2'-0"	3'-7"
49'	50'-11"	3'-0 1/2"	1'-9"	10"	1'-5"	4'-1"	1'-2"	3'-3"	2'-10"	2'-2"	3'-8"
57'	58'-11"	3'-3 1/2"	1'-11"	10"	1'-6"	4'-0"	1'-3"	3'-4"	3'-1"	2'-4"	3'-8"
65'	66'-11"	3'-3 1/2"	1'-11"	10"	1'-6"	4'-0"	1'-3"	3'-4"	3'-1"	2'-4"	3'-8"

*Allow 1'-8" additional length for each splice – Maximum length of bar 20 ft.

SPAN	Number of Bars Required.												Hoops
	A	B	C	D	E	F	G	K	L	M	N	O	H
25'	28	27	28	18	4	36	32	4	4	4	6	24	24
33'	36	35	36	18	4	36	40	6	6	6	9	32	30
41'	44	43	44	18	4	36	48	8	8	8	12	40	36
49'	52	51	52	18	4	36	56	10	10	10	15	48	42
57'	60	59	60	18	4	36	64	12	12	12	18	56	48
65'	68	67	68	18	4	36	72	14	14	14	21	64	54

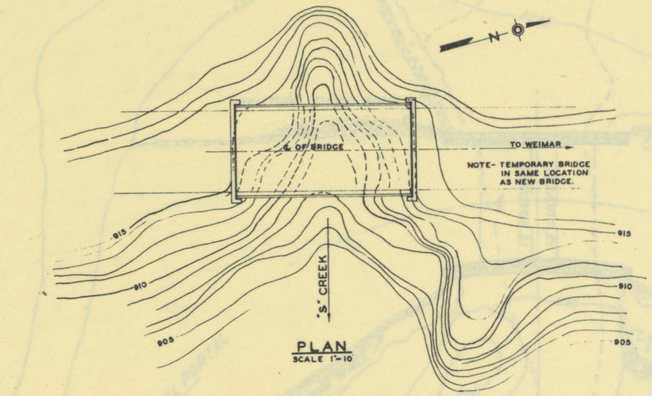
Notes:–

Make diameter of bend not less than 6 bar diameters – Total length of hook not less than 16 bar diameters.

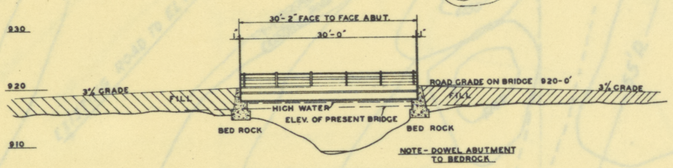
Lengths are finished lengths – Shop to make allowance for bends.

REINFORCING STEEL
BENDING DIAGRAM
For
CONCRETE DECK BRIDGES
(DWG. NO. B-2201)

April 1933 M.E.G.

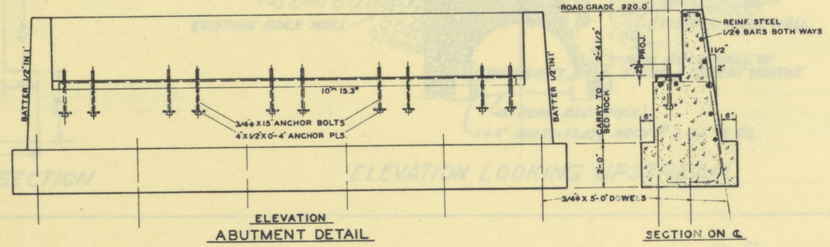


PLAN
SCALE 1"-10



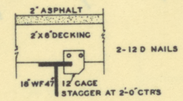
PROFILE LOOKING UPSTREAM
SCALE 1"-10-0"

PLAN

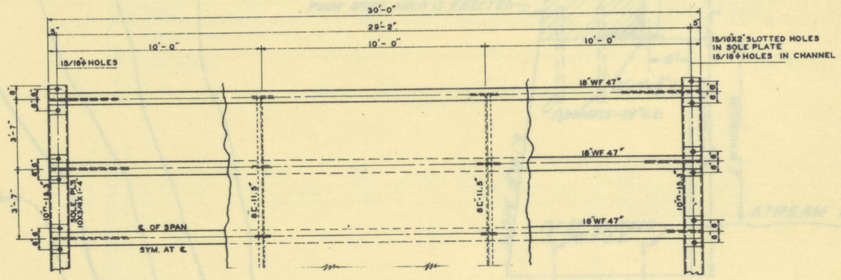


ELEVATION
ABUTMENT DETAIL

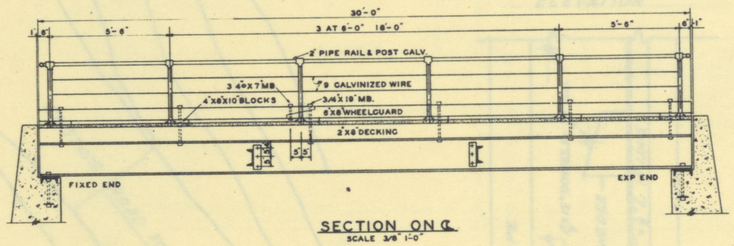
SECTION ON ℄



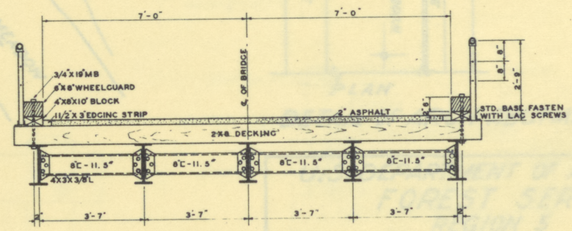
DECKING CLIP DETAIL



HALF PLAN



SECTION ON ℄
SCALE 3/8" 1'-0"



TYPICAL SECTION
SCALE 3/8" 1'-0"

BOLT LIST		
NO	DESCRIPTION	ITEM
20	3/4ø X 15" MB - 4" THRD - 3 HEX NUTS	ANCHOR BOLTS
12	3/4ø X 19" MB	WHEEL GUARD
2	3/4ø X 7" MB	WHLGD SPLICE
20	4"x1/2"x 0'-4" 13/16ø HOLE IN CTR	ANCHOR PLATES
80	DECKING CLIPS 12 GA.	
ALL BOLTS OVER 12" LONG TO HAVE A MINIMUM OF 3" THREAD		

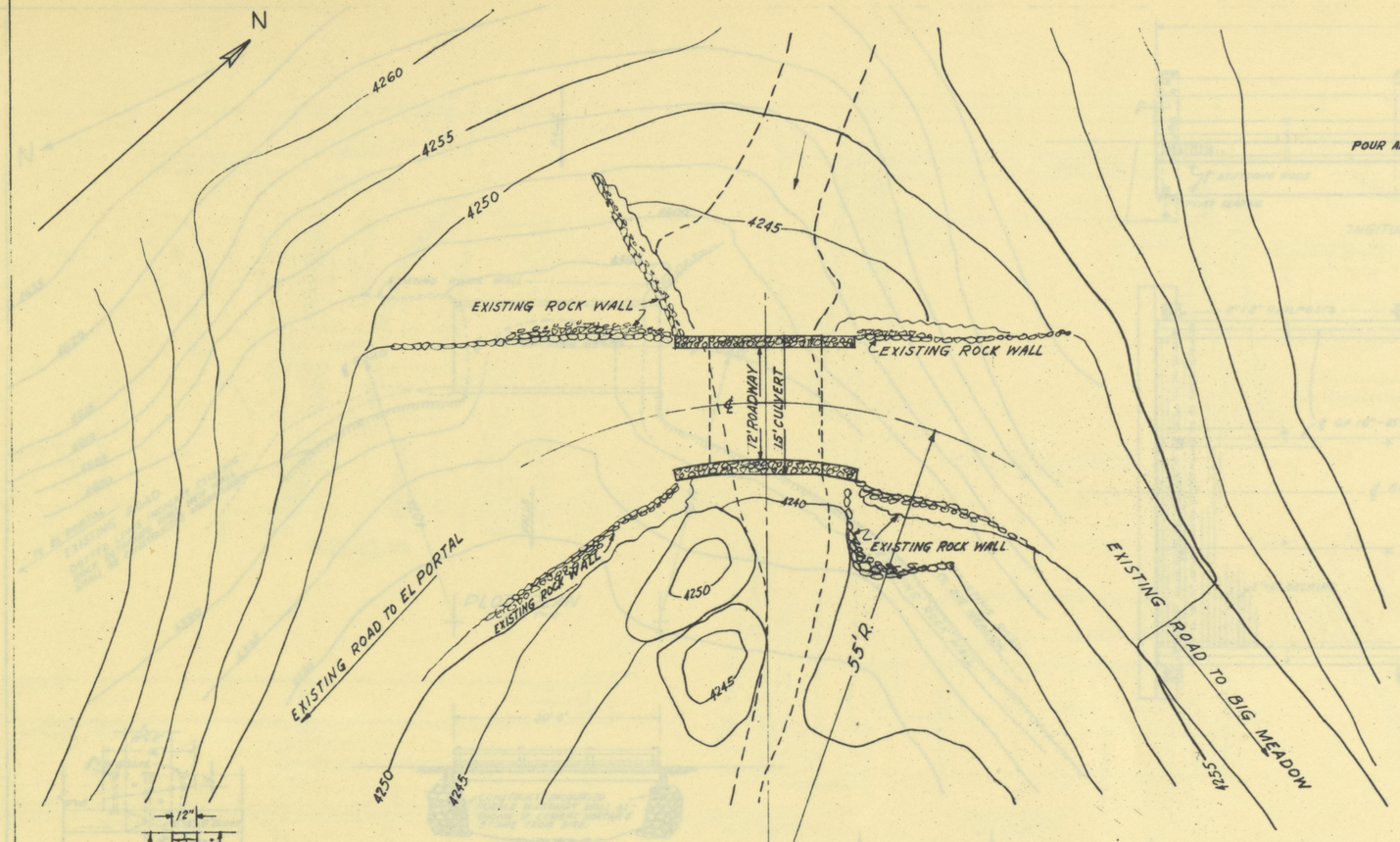
NOTE—
RIVETS 3/4ø
FIELD CONNECTIONS ROLLED BODY BOLTS.
SUB-PUNCH FIELD CONNECTION HOLES 9/16ø AND REAM TO A SNUG FIT FOR R.B. BOLTS WITH MEMBERS IN PLACE.
MATCH MARK FIELD CONNECTIONS.

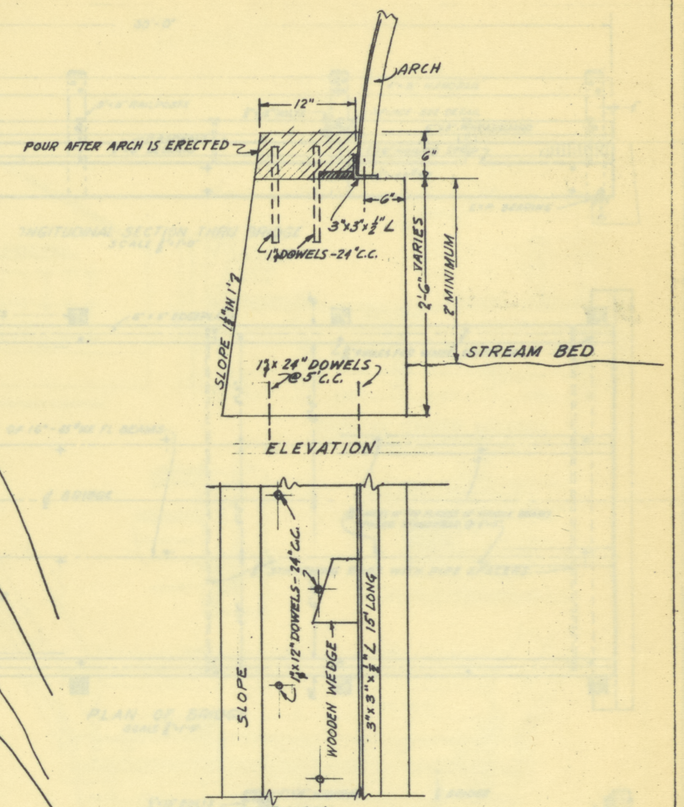
U S DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER REGIONAL ENGINEER

S CREEK BRIDGE

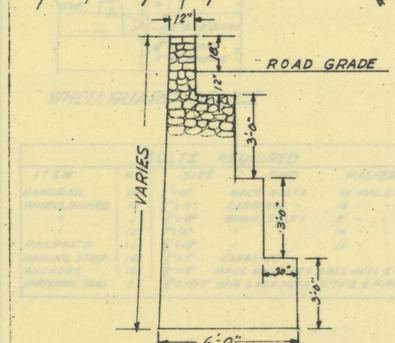
LOADING H 15 ROADWAY 12'
TAHOE NATIONAL FOREST

DESIG NED-ML-ERH DRAWN-RHL TRACED-RAC
SCALE 3/8"-1'-0" & 1"-10 CHECKED
APPROVED E.W. Kramer DATE
REGIONAL ENGINEER

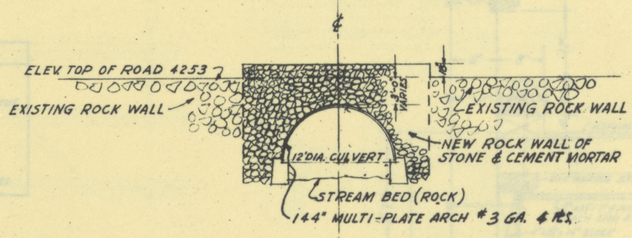




DETAIL OF ARCH ABUTMENTS



TYPICAL WALL SECTION



ELEVATION LOOKING UPSTREAM

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

LITTLE CRANE CREEK BRIDGE #2

LOADING H-15 ROADWAY 12'
STANISLAUS NATIONAL FOREST

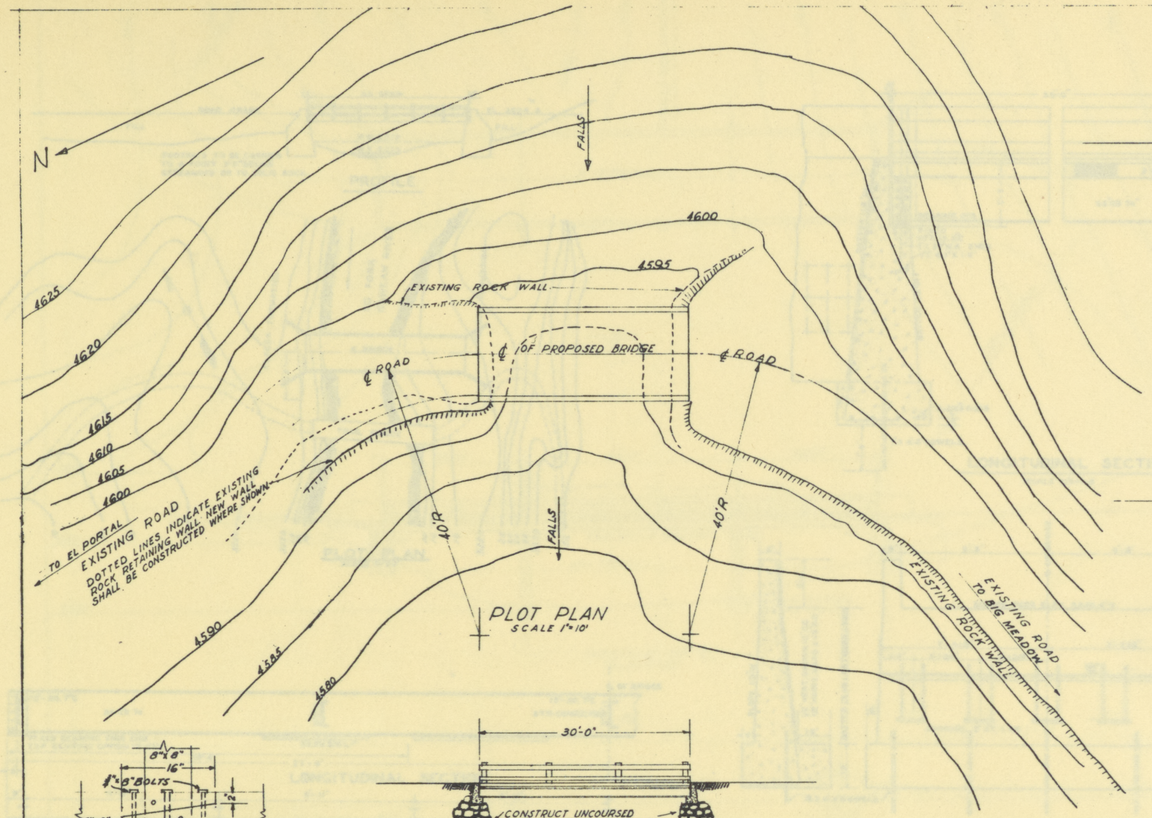
SCALES: 1"=10'
DATE:

Designed	Design Checked	Drawn	Traced	Tracing Checked
J.H.L.	N.F.M.	E.A.M.		N.F.M.

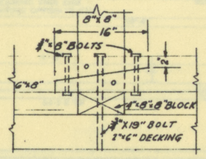
Approved By: E.W. Kramer
Regional Engineer

Sheet 1 of 2

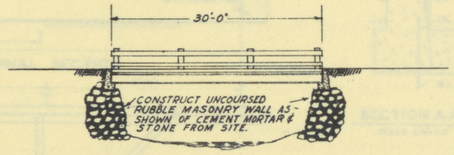
CORRECT: John H. Lawrence
BRIDGE ENGINEER



PLOT PLAN
SCALE 1"=10'

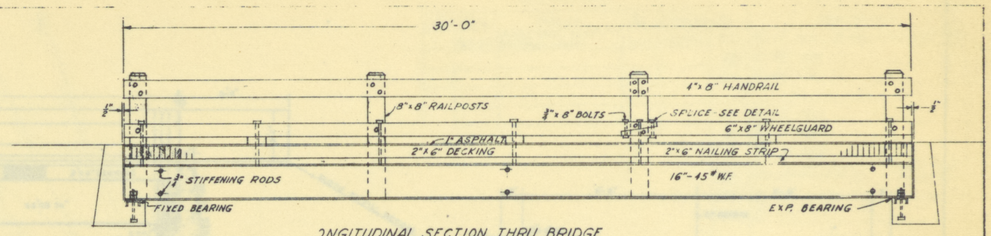


WHEELGUARD SPLICE

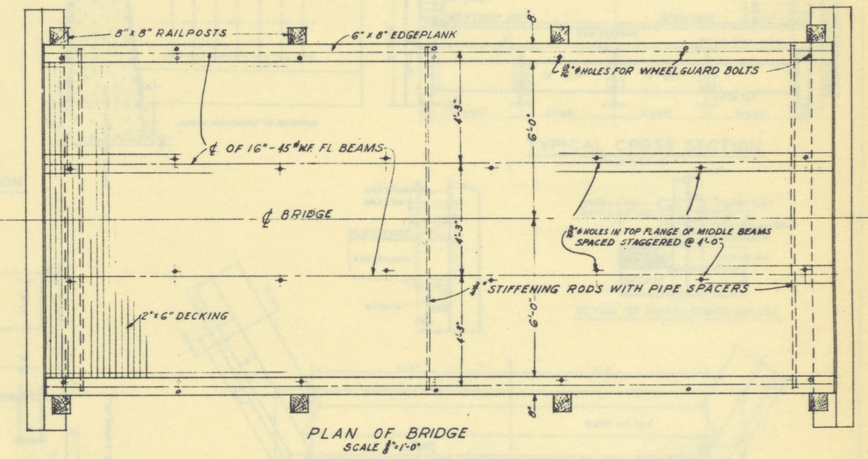


PROFILE ON ℄

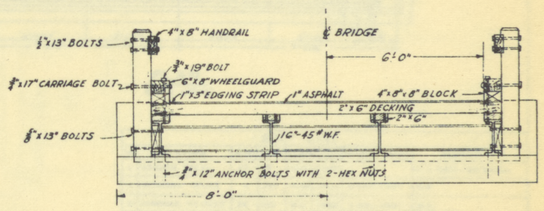
BOLTS REQUIRED				
ITEM	NO.	SIZE	KIND	WASHERS
HANDRAIL	20	⅝"x13"	MACH. BOLTS	40 MAL. C.I.
WHEELGUARD	10	⅝"x17"	CARRIAGE "	10 " - - & 10-1" CUT
"	4	⅝"x8"	MACH. BOLTS	8 " " "
"	14	⅝"x19"	" "	14 " " "
RAILPOSTS	16	⅝"x13"	" "	16 " " "
NAILING STRIP	16	½"x3"	CARRIAGE "	
ANCHORS	16	¾"x12"	MACH. BOLTS WITH 3 HEX NUTS & 4"TH'D.	
STIFFENING RODS	3	⅝"x13'-2" WITH 2 HEX NUTS -3"TH'D & PIPE SPACERS		



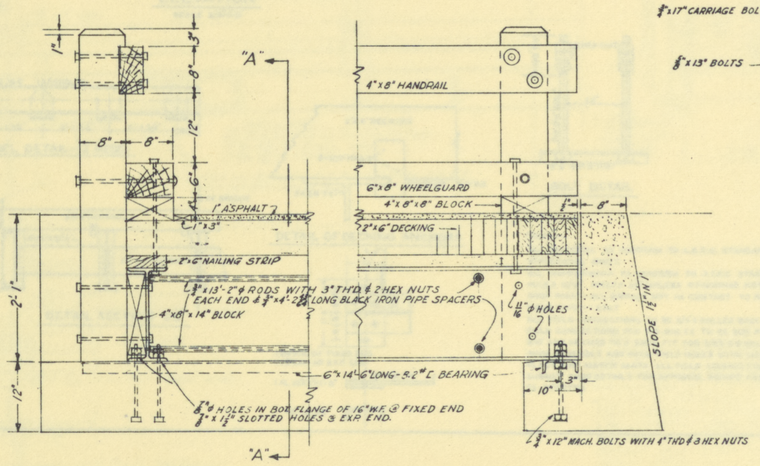
LONGITUDINAL SECTION THRU BRIDGE
SCALE ⅜"=1'-0"



PLAN OF BRIDGE
SCALE ⅜"=1'-0"



CROSS SECTION THRU BRIDGE



END SECTION

SIDE SECTION "A-A"

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

LITTLE CRANE CREEK BRIDGE
#2

LOADING H-15 ROADWAY 12'
STANISLAUS NATIONAL FOREST

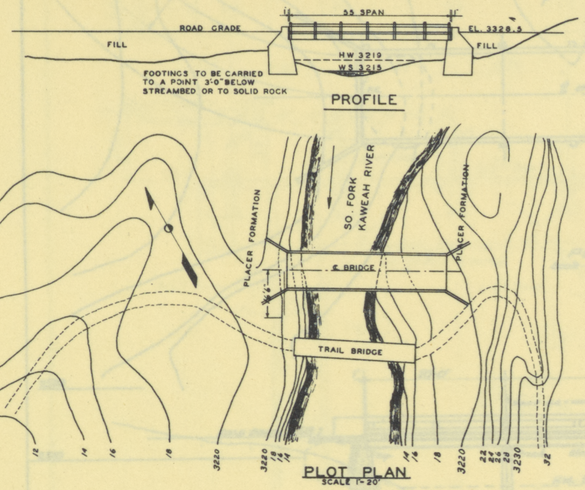
Scales:
Date: 6-34

Designed	Design Checked	Drawn	Traced	Tracing Checked
JHL	NFM	EAM	-	NFM

Approved By: Ellis Kramer
Regional Engineer

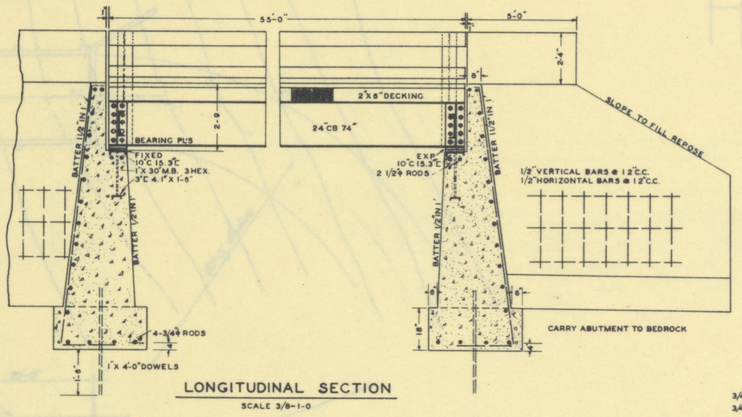
Sheet 2 of 2

CORRECT: John H. Lawrence
BRIDGE ENGINEER

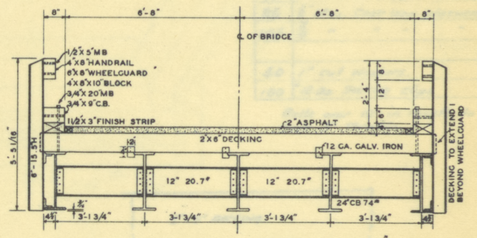


PROFILE

PLOT PLAN
SCALE 1"=20'



LONGITUDINAL SECTION
SCALE 3/8"=1'-0"



TYPICAL CROSS SECTION
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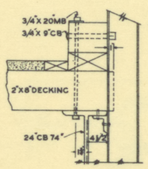
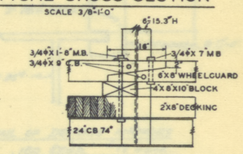
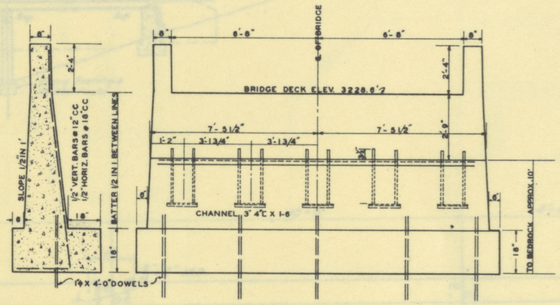


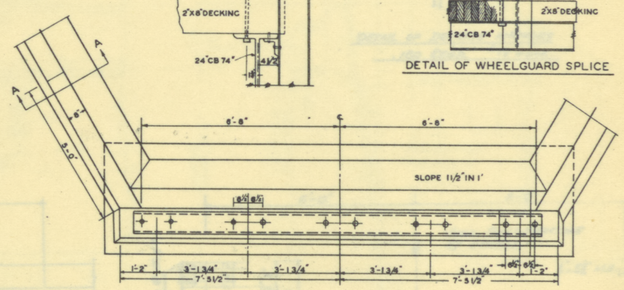


DETAIL OF WHEELGUARD SPLICE

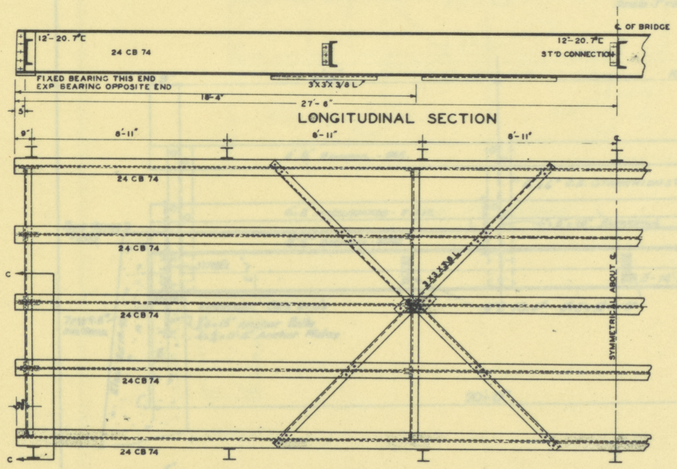


SECTION A-A
SCALE 3/8"=1'-0"

ELEVATION
SCALE 3/8"=1'-0"



PLAN
SCALE 3/8"=1'-0"



LONGITUDINAL SECTION

PLAN
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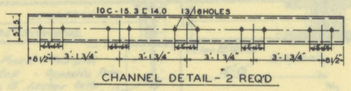
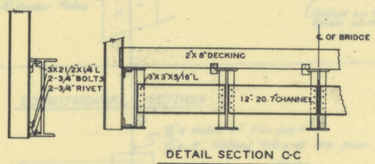
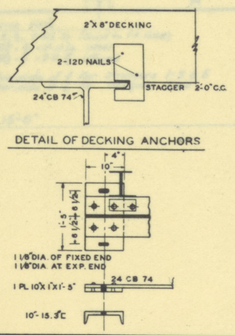


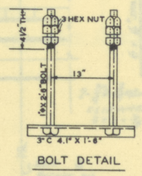
CHANNEL DETAIL - 2 REQ'D



DETAIL SECTION C-C



DETAIL OF DECKING ANCHORS



BOLT DETAIL

BOLT LIST

NO.	LOCATION	NO REQ	SIZE	LGTH	NUTS PER BOLTS	WASHER PER BOLT	REMARKS
1	ANCHOR BOLTS	20	1"	2'-6"	3 HEX		4 1/2 THRD - SEE DETAIL
2	HANDRAIL SPLICE	8	1/2"	0'-8"	1 HEX	2 MAL CAST	M.B.
3	HANDRAIL TO POST	28	1/2"	0'-5"	1 HEX	1 MAL CAST	M.B.
4	WHEELGUARD TO POST	28	3/4"	0'-8"	1 HEX		C.B.
5	WHEELGUARD TO STOP	28	3/4"	1'-8"	1 HEX	1 MAL CAST	M.B. 3" THRD
6	WHEELGUARD SPLICE	4	3/4"	0'-8"	1 HEX	2 MAL CAST	M.B.
7	SPACING CHANNELS	160	3/4"		1 HEX		ROLLED BODY BOLTS

NOTE—
ALL MATERIAL TO CONFORM TO A.S.T.M. STANDARDS FOR STRUCTURAL SHEET.
ALL WORKMANSHIP TO CONFORM TO A.I.S.C. STANDARDS
HOLES 13/16" RIVETS 3/4" UNLESS OTHERWISE NOTED
SHOP PAINT - ALL SURFACE NOT IN CONTACT TO RECEIVE 1 COAT
FIELD PAINT - 1 COAT
ALL FIELD CONNECTIONS TO BE 3/4" ø ROLLED BODY BOLTS
FIELD CONNECTIONS FOR R.B. BOLTS TO BE SUB PUNCHED 9/16" AND REAMED TO A SNUG FIT FOR 3/4" ø R.B. BOLTS
SHOP ASSEMBLE AND REAM FIELD HOLES WITH MEMBER IN PLACE AND MATCH MARK ALL FIELD CONNECTIONS
SUBMIT SHOP DETAILS FOR APPROVAL BEFORE FABRICATION IS STARTED.

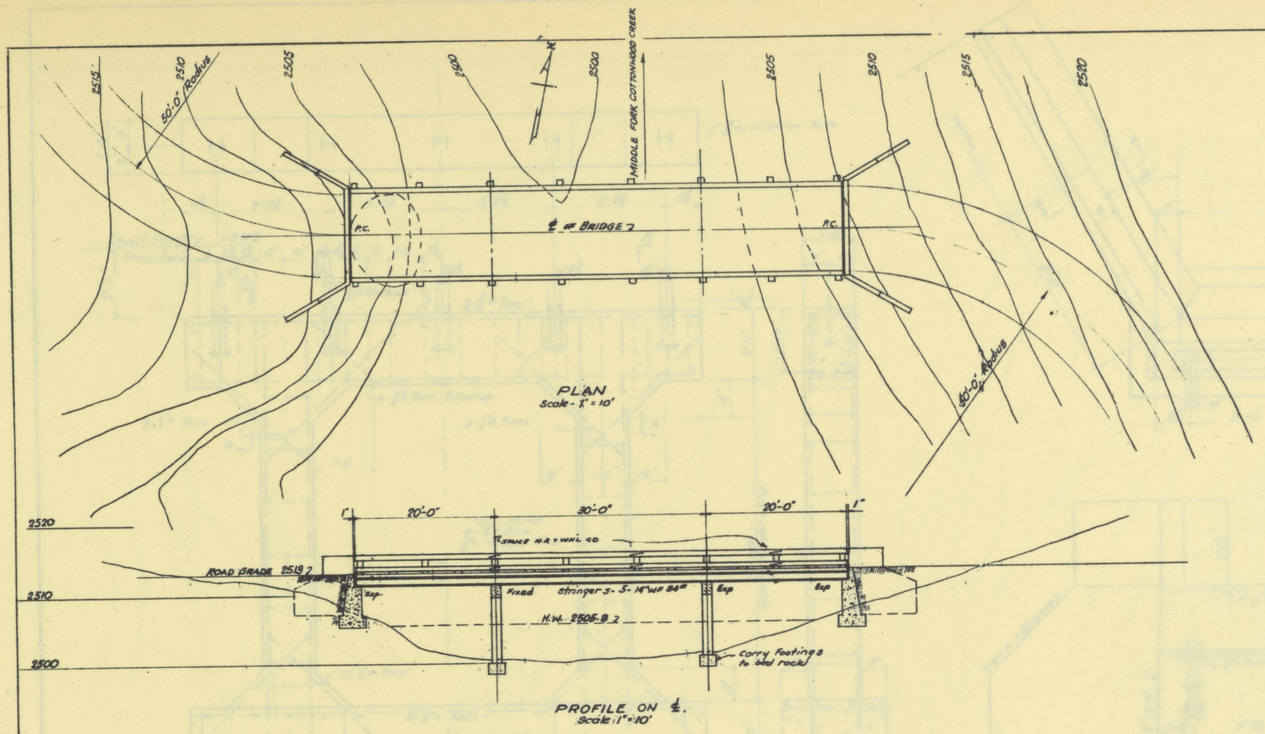
U S DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER, REGIONAL ENGINEER

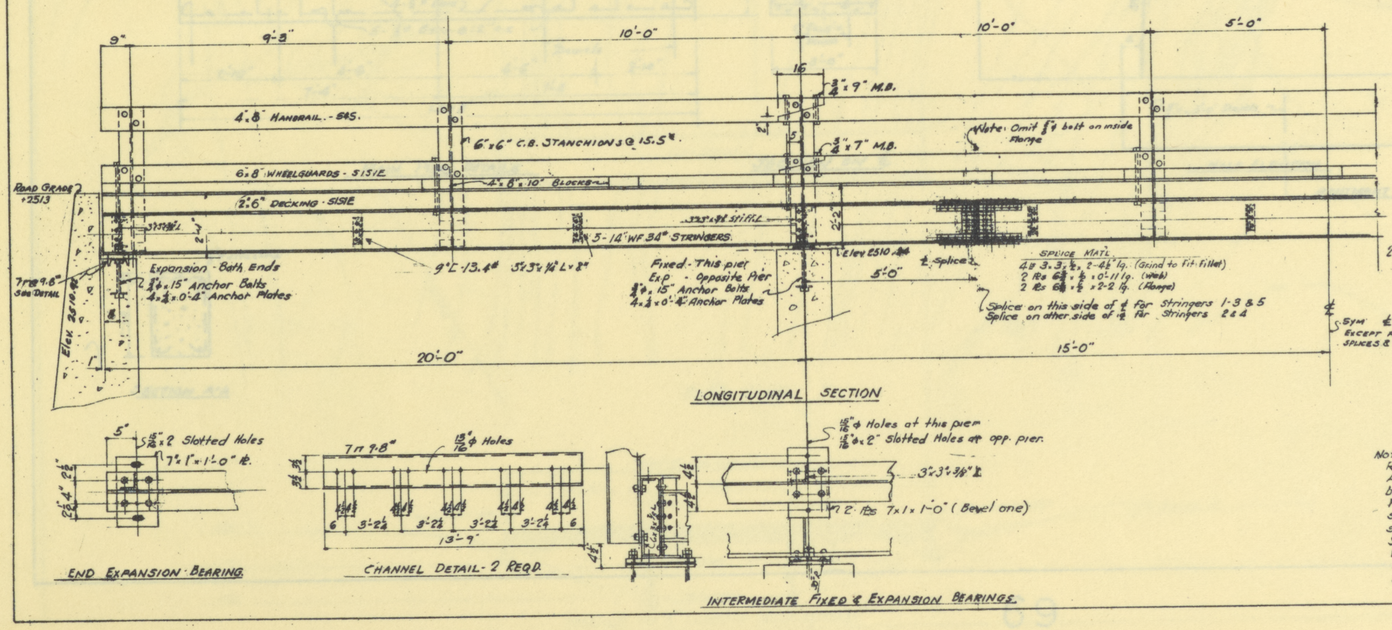
SO. FORK KAWEAH RIVER

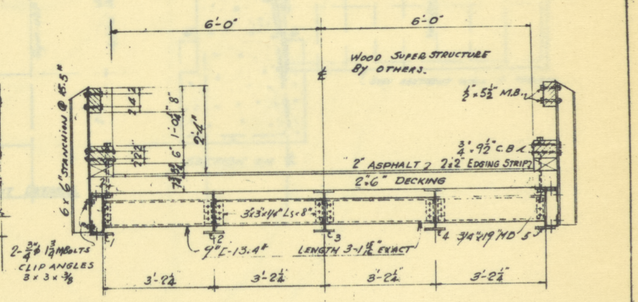
LOADING H 15 ROADWAY 12'
SEQUOIA NATIONAL FOREST

DESIGNED-JHL-ERH- DRAWN RAC TRACED RAC
SCALE 1/2"=1'-0" 3/8"=1'-0" 1"=20' CHECKED
APPROVED DATE

CORRECT — Civil Engineer



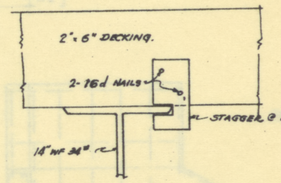




REVISIONS.				
No	Date	Item	By	Authority
1	8-2-35	WOOD RAIL POST TO STEEL POSTS	R.H.L.	NUBER.

BOLT LIST.	
No	Description.
40	⅞" x 15 M.B. 3 Hex. Nuts. (4½" mid)
35	½" x 5½" M.B.
35	⅞" x 9½" C.B.
14	¾" x 9 M.B.
8	¾" x 7" M.B.
18	¾" x 19 M.B.
40	Rs 4"x4"x0'-4"lg. 13/16" ø Hole in center
85	¾" Mal. Cast Iron Washers.
105	¾" " " "
40	1" cut Washers.
180	#12 Ga. Decking clips

Bolts over 12" in length to have 3" Threads.



DETAIL OF DECKING ANCHORS
180 REQD. #12 Gage.

Notes
Rivets ⅞"ø
All field connections to be ⅞"ø Rolled Body bolts.
Field connections for R.B. Bolts to be sub-punched ⅝"ø and reamed to a snug fit for ⅞"ø R.B. Bolts.
Shop assemble and ream field holes with member in place and match mark all field connections.
Submit shop details for approval before fabrication is started.

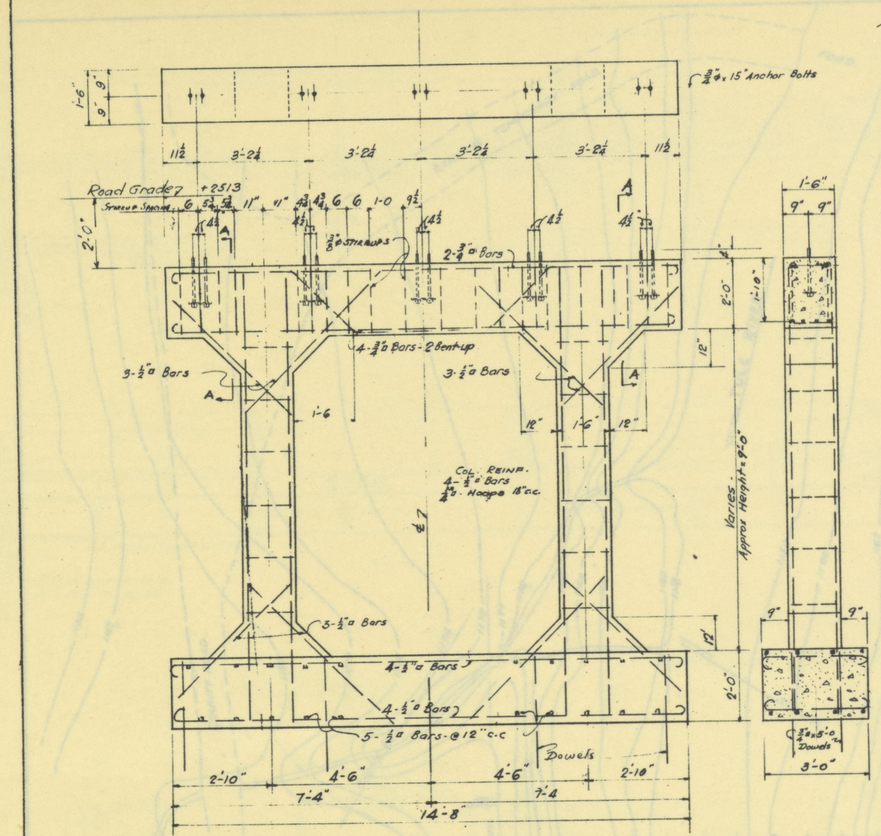
U.S. DEPARTMENT OF AGRICULTURE.
FOREST SERVICE
REGION 5

MIDDLE F.K. COTTONWOOD CREEK BRIDGE

LOADING H-15 ROADWAY 12'
TRINITY NATIONAL FOREST
DATE FEB. 4, 1936
SCALES-
DESIGNED DESIGN E.A.M. CHECKED DRAWN R.H.L. TRACED TRACING CHECKED E.A.M.
CHK.- R.H.L.
APPROVED BY:
SHEET 1 OF 2

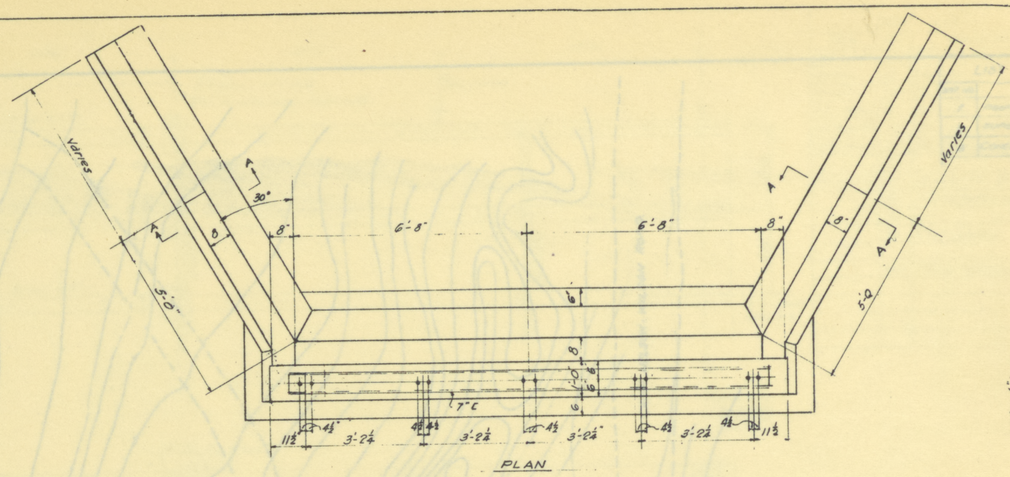
CORRECT. John H. Dieterich
BRIDGE ENGINEER

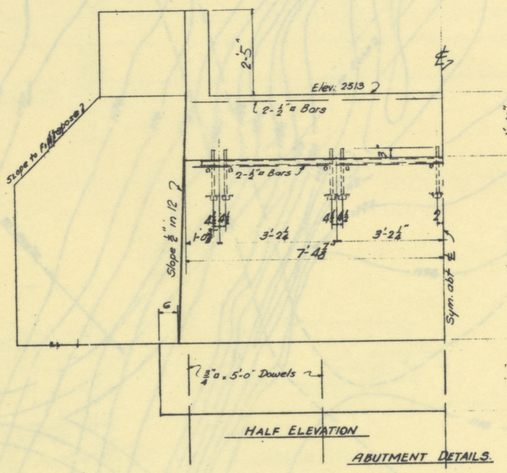
E.W. Kramer
REGIONAL ENGINEER



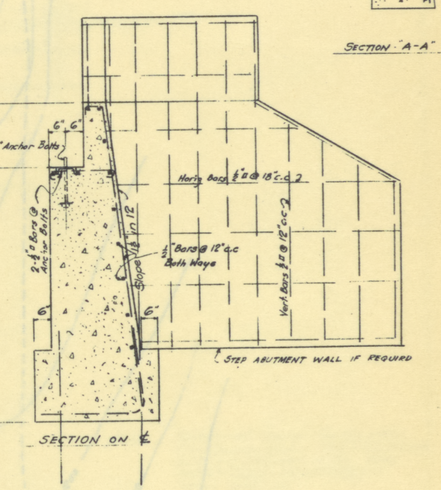
MAIN PIER DETAILS.

SECTION ON ℄.





ABUTMENT DETAILS.



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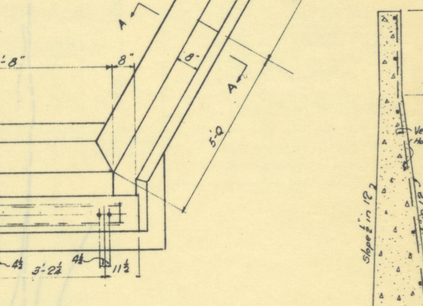
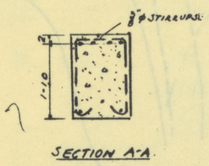


SECTION "A-A"



SECTION A-A

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

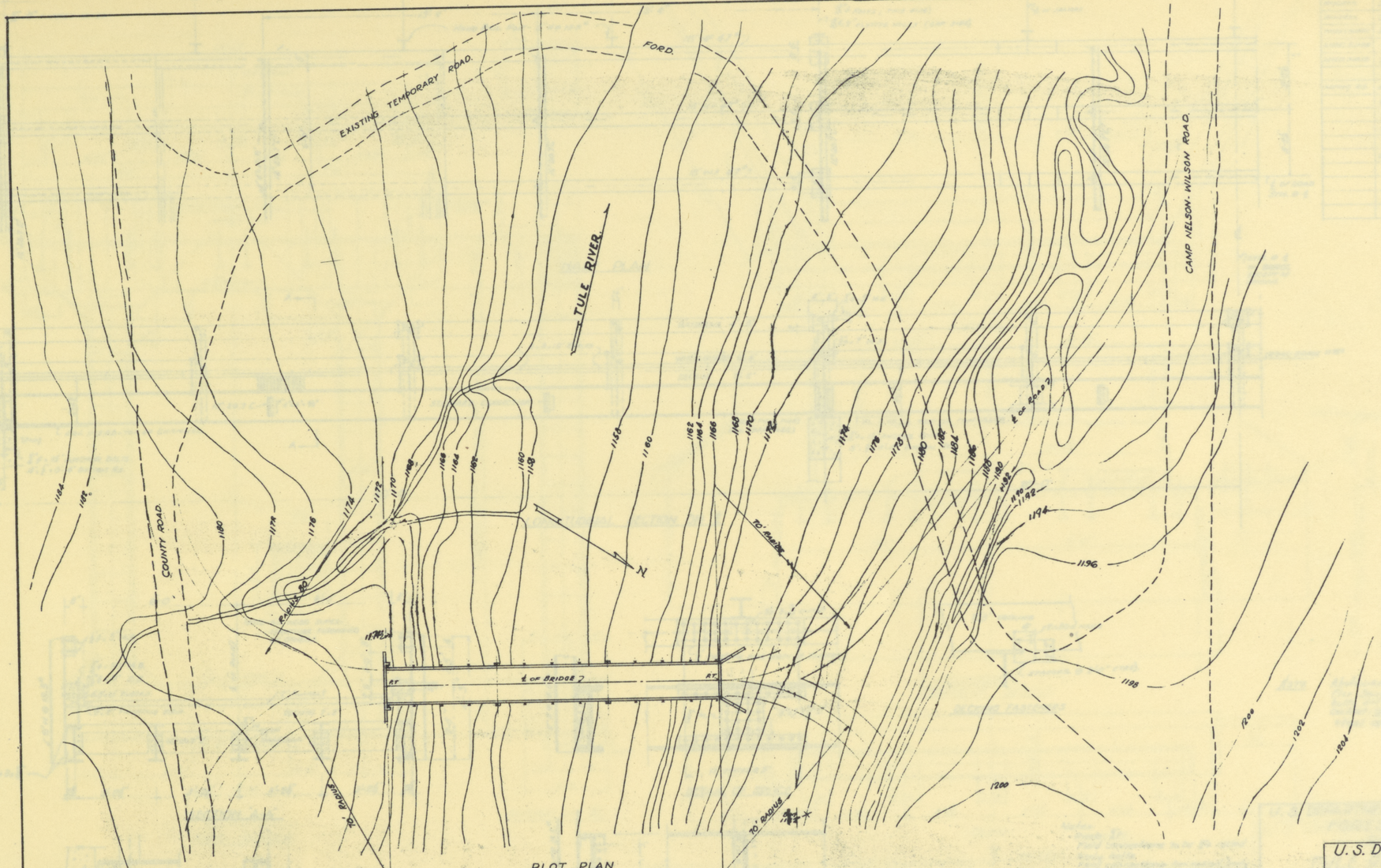
MIDDLE FORK COTTONWOOD CREEK BRIDGE.

LOADING H10 ROADWAY 12'
TRINITY NATIONAL FOREST
DATE: FEB. 1945
SCALE:
DESIGNED BY: DESIGN CHKD. BY: DRAWN TRACED TRACING CHECKED
CHL-RHL E.A.M. R.H.L E.A.M.

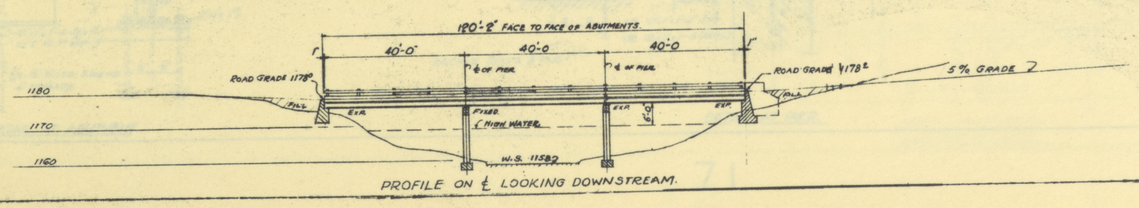
APPROVED BY:
SHEET 2 OF 2 REGIONAL ENGINEER

DISTRICT ENGINEER
BRIDGE ENGR

LIST OF DRAWINGS.	
SHT No.	DESCRIPTION.
1	PROFILE & PLOT PLAN.
2	SUPERSTRUCTURE DETAILS
3	CONCRETE DETAILS



PLOT PLAN
SCALE- 1"=20'



PROFILE ON ℄ LOOKING DOWNSTREAM.

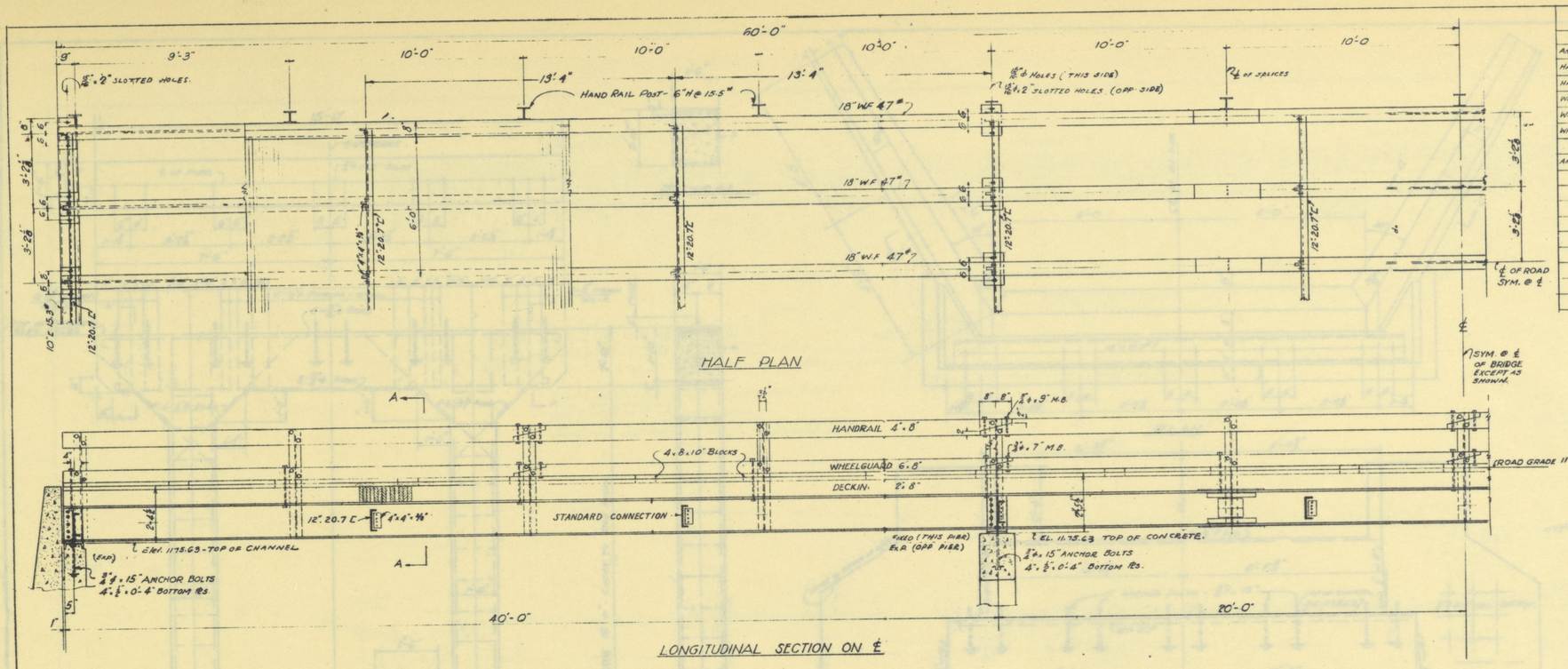
REVISIONS				
No	Date	Item	By	Authority

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5.

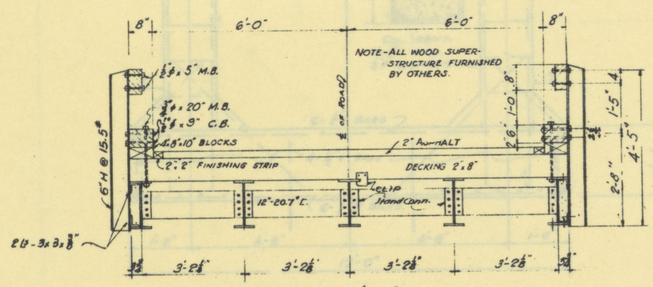
TULE RIVER BRIDGE

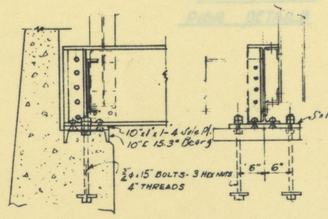
LOADING H-15 ROADWAY 12'
SEQUOIA NATIONAL FOREST
DATE: APRIL 5, 1938
SCALE: 1"=20'
DESIGNED DESIGN CHECKED DRAWN TRACED TRACING CHECKED
VHL-RHL V.H.L. RHL
APPROVED BY:
SHEET 1 OF 3 ACTING REGIONAL ENGINEER

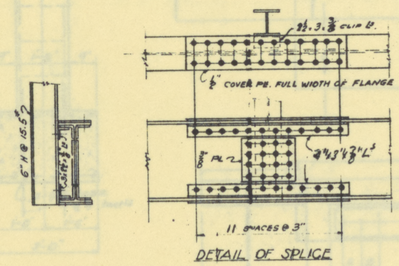
CORRECT: John A. Bellmore
BRIDGE ENGINEER.

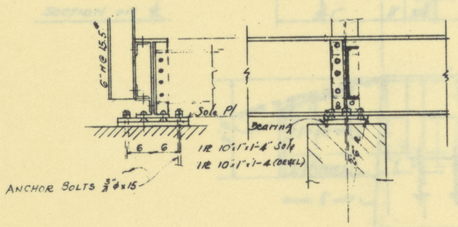


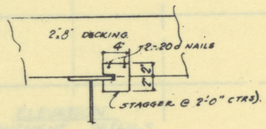
BOLT LIST		
ITEM	NO	DESCRIPTION
ANCHOR BOLTS	40	⅞"ø x 15" M.B. 3 HEX NUTS (2" THD)
HANDRAIL	52	½"ø x 5" M.B.
HANDRAIL	20	⅝"ø x 9" M.B.
WHEELGUARD	52	⅝"ø x 9" C.B.
WHEELGUARD	10	⅝"ø x 7" M.B.
WHEELGUARD	76	⅝"ø x 20" M.B.
ANCHOR PLS.	40	PLS 4"x ⅜"x 0'-4" 15/16" HOLE
	60	M.C.I. WASHERS FOR ⅝"ø BOLT
	90	" " " FOR ¾"ø BOLT
	60	¾" CUT WASHERS.
	300	" 12 Go. DECKING CLAMPS.











NOTE Abutment Channel bearing plates, Pier Bearing plates and superstructure bolts not included in this steel Contract. INCLUDE DECK CLAMPS IN steel contract.

Notes:
Rivets ¾"ø
Field connections to be ¾"ø rolled body bolts
Field connections for rolled body bolts to be sub-punched ⅝"ø and reamed to a snug fit for ¾"ø rolled body bolts.
Paint:- AS PER SPEC.
ASSEMBLE IN SHOP & PLACE MARK ALL FIELD CONNECTIONS

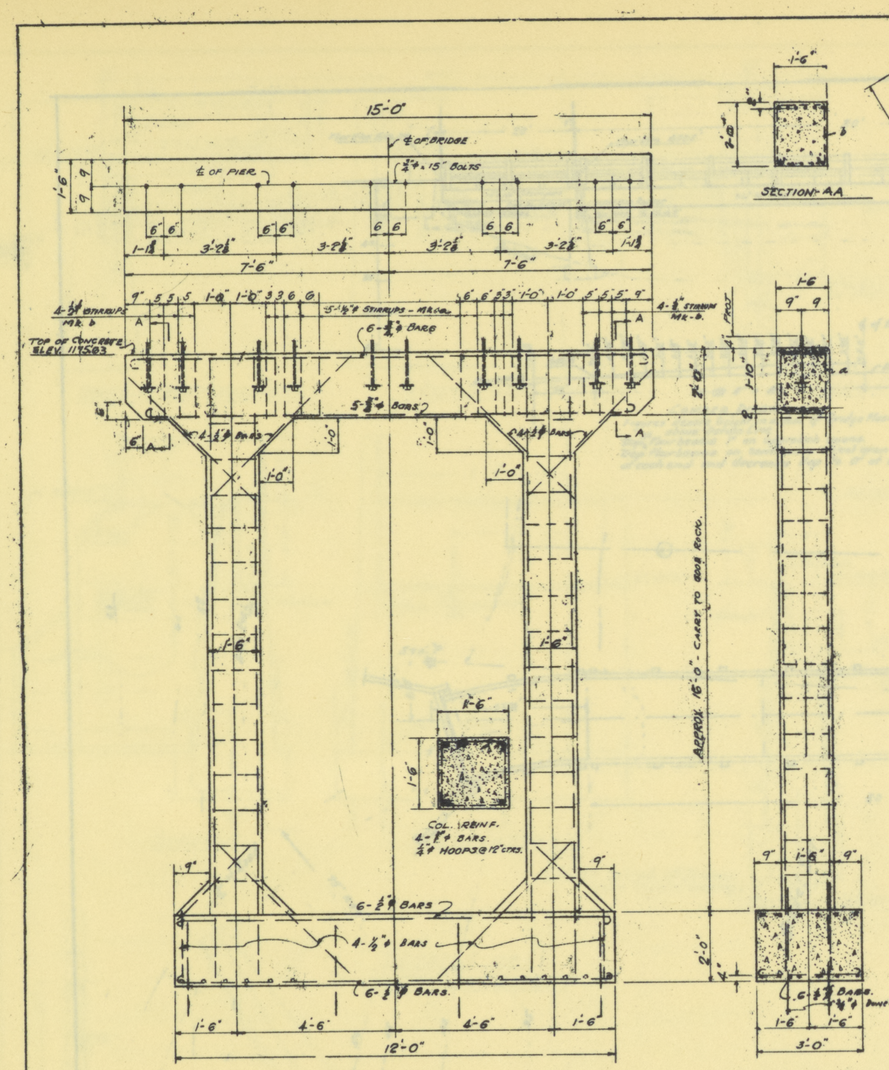
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

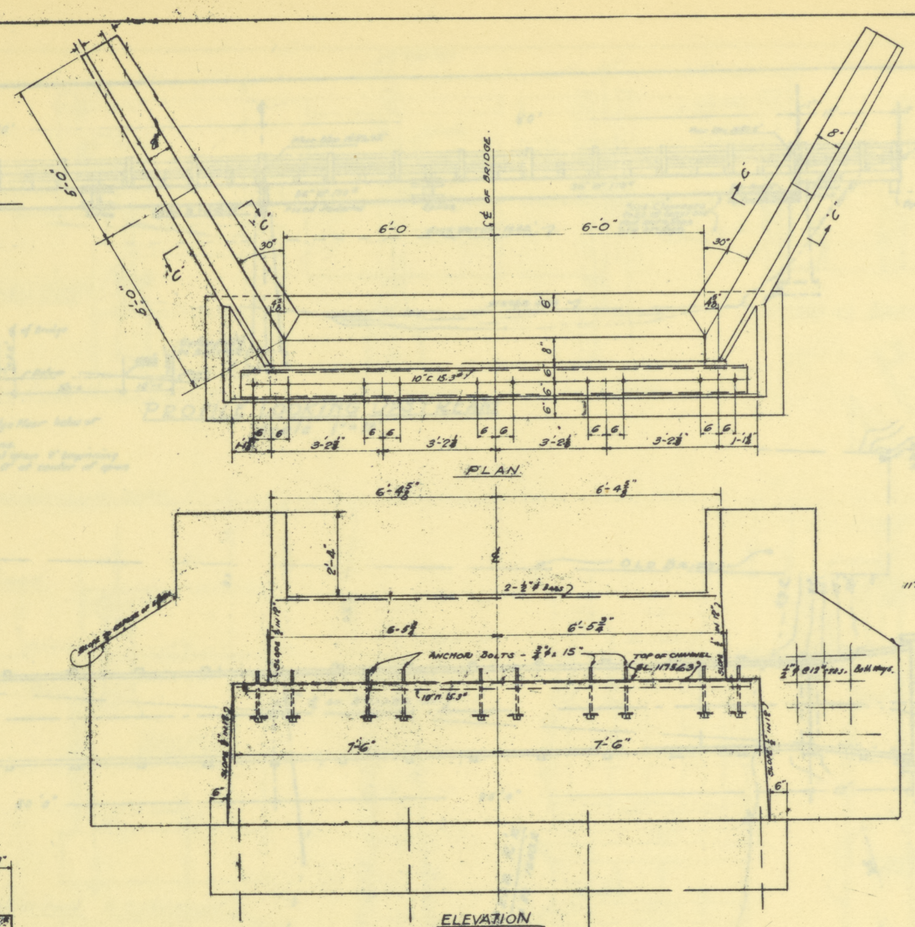
TULE RIVER BRIDGE

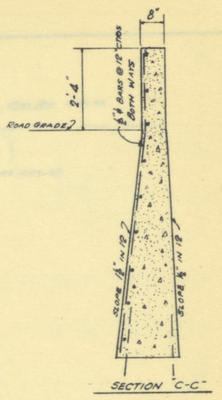
LOADING M-15 ROADWAY 12'
SEQUOIA NATIONAL FOREST

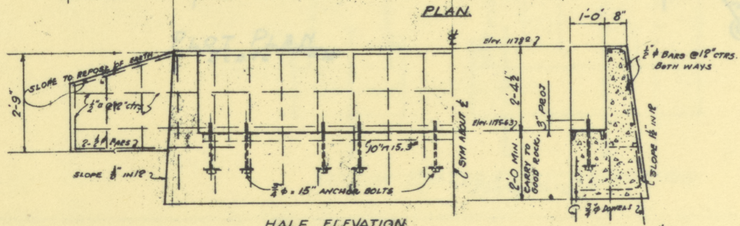
DATE: MARCH 20, 1935.
SCALE:
DESIGNED. J.H.L. DESIGN CHECKED R.H.L. DRAWN N.W.Y. TRACED TRACING CHECKED R.H.L.
APPROVED BY: Acting Regional Engineer
SHEET 2 OF 3

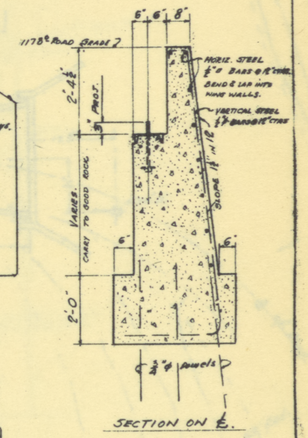
Checked: H. H. Wagstaff
Bridge Engineer











U. S. DEPARTMENT OF AGRICULTURE.
FOREST SERVICE
REGION 5

TULE RIVER BRIDGE

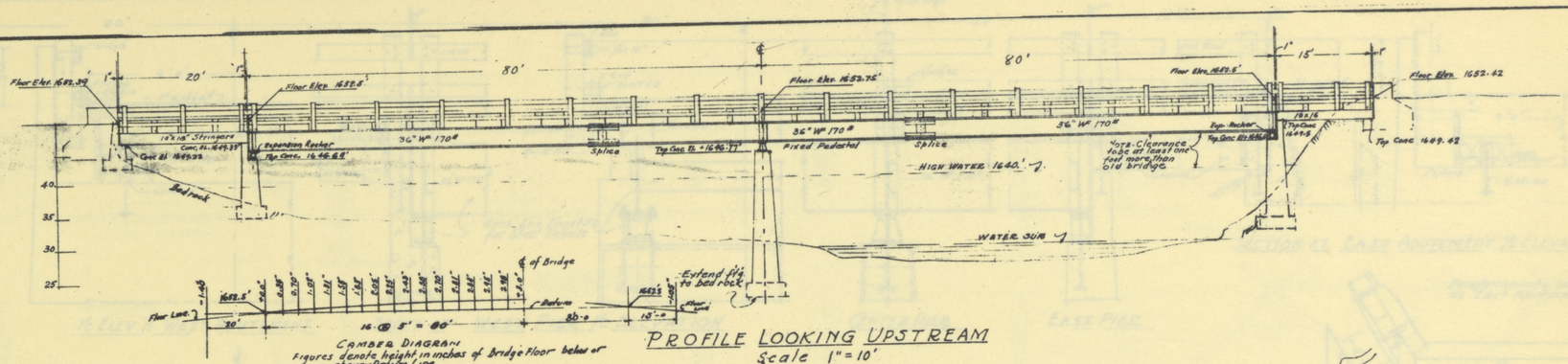
LOADING H-15 ROADWAY 12'
SEQUOIA NATIONAL FOREST
DATE: APRIL 5, 1935.
SCALE: ½"=1'-0

DESIGNED	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED
J.H.L.-R.M.L.	N.W.M.	R.M.L.		

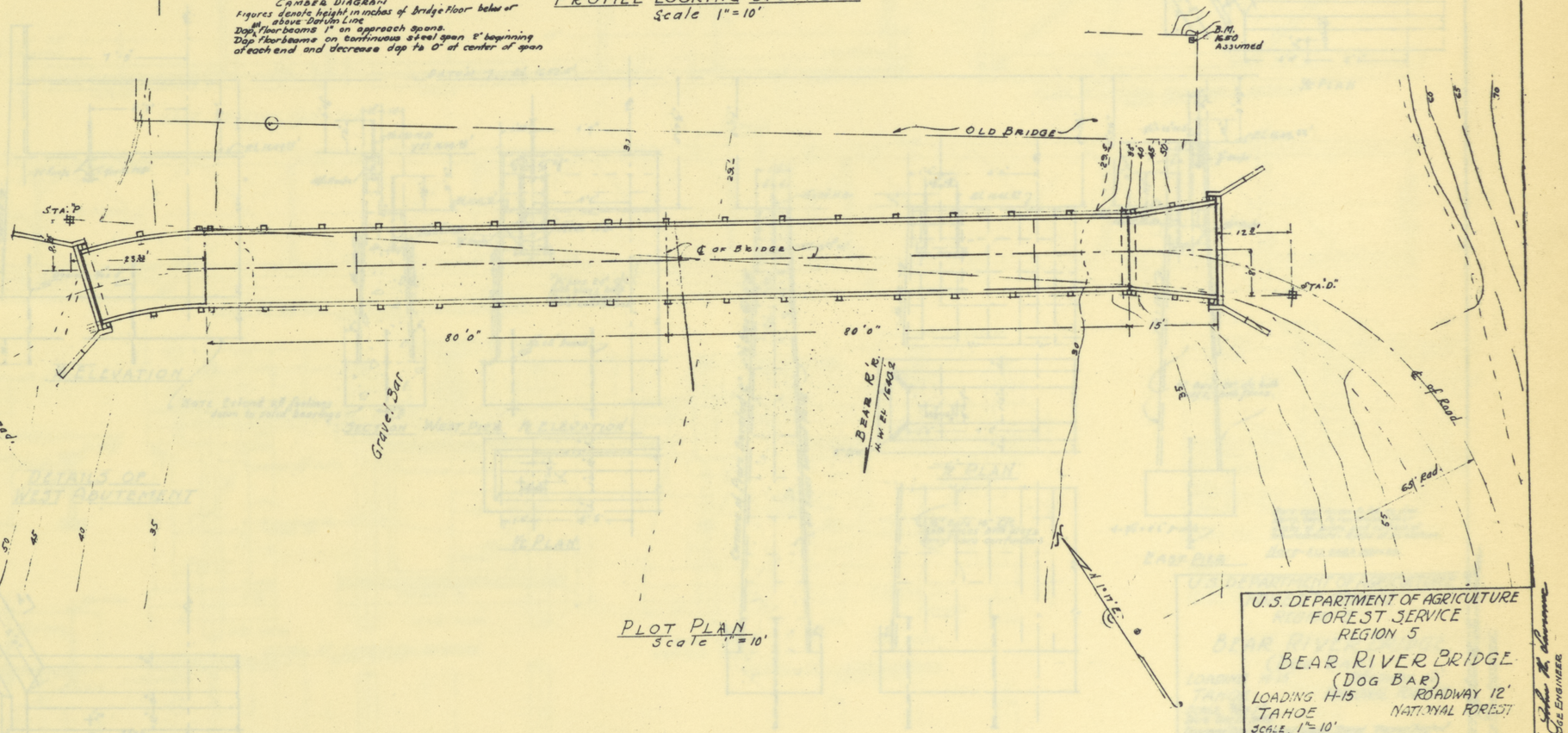
APPROVED BY: [signature] REGIONAL ENGINEER

SHEET 3 OF 3 ACTING

[signature] DRAWN BY



PROFILE LOOKING UPSTREAM
Scale 1" = 10'



PLOT PLAN
Scale 1" = 10'

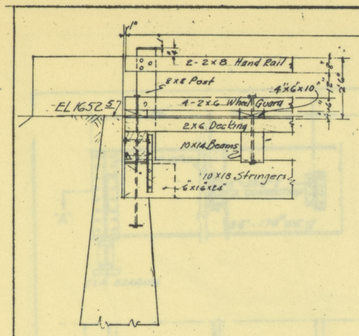
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

BEAR RIVER BRIDGE
(DOG BAR)

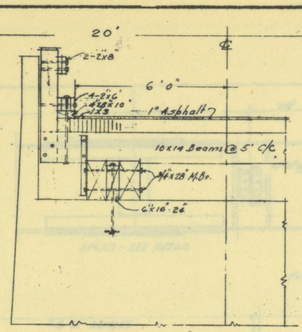
LOADING H-15 ROADWAY 12'
TAHOE NATIONAL FOREST
SCALE 1" = 10'
DATE Nov 27 1934
Designed Design Checked W.H.L. H.W.H. W.B.L. Drawn H.W.H. Traced Marks Traced Checked J.T.M.B.
APPROVED BY
Sheet 1 of 3

E.W. Kramer
Regional Engineer

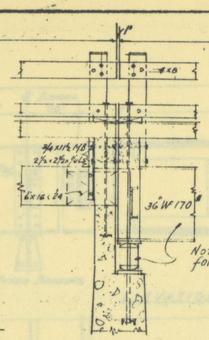
CORRECT Ed. M. Kramer
BRIDGE ENGINEER



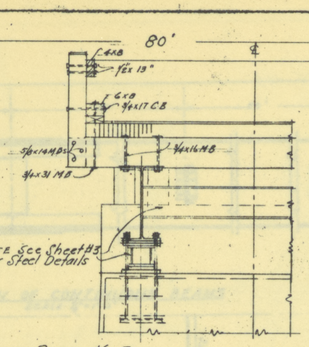
SECT'N. AT WEST ABUTEMENT

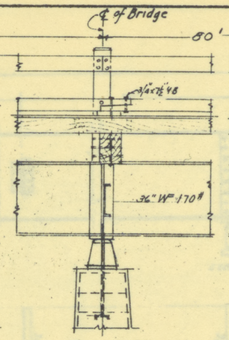


½ ELEV'N. WEST ABUTEMENT

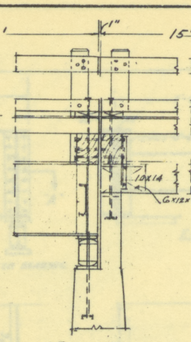


SECT'N AT WEST PIER ½ ELEVATION

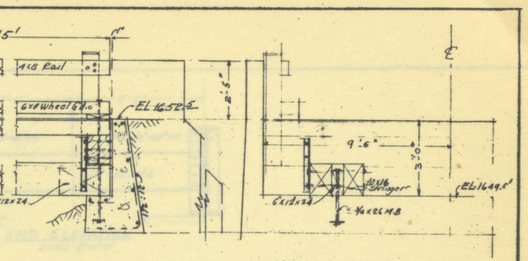




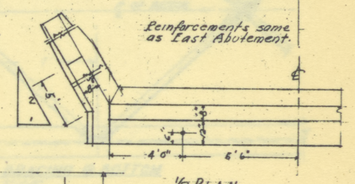
CENTER PIER



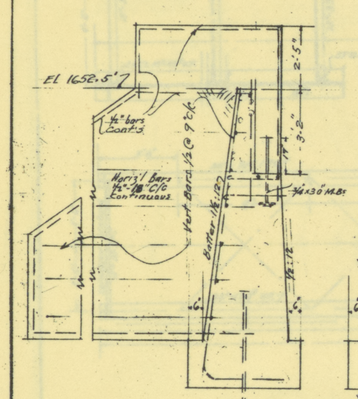
EAST PIER



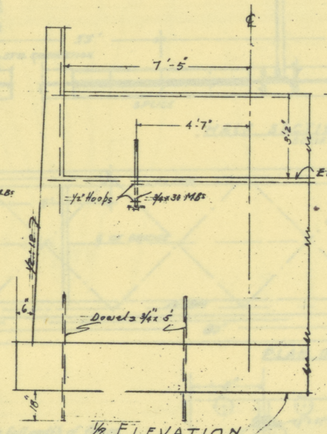
SECTION AT EAST ABUTEMENT ½ ELEVATION



½ PLAN

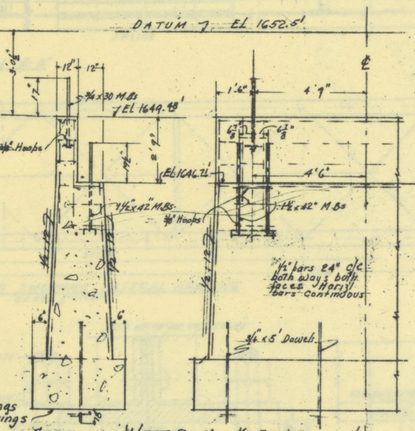


SECTION



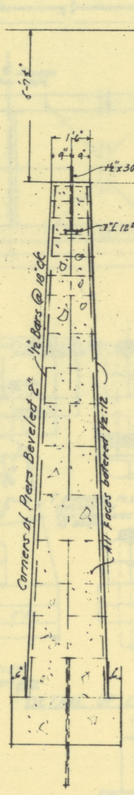
½ ELEVATION

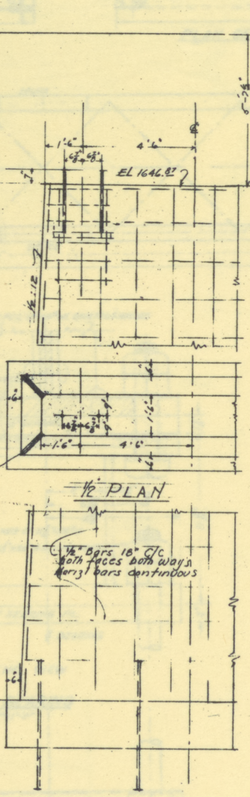
Note Extend all footings down to solid bearings

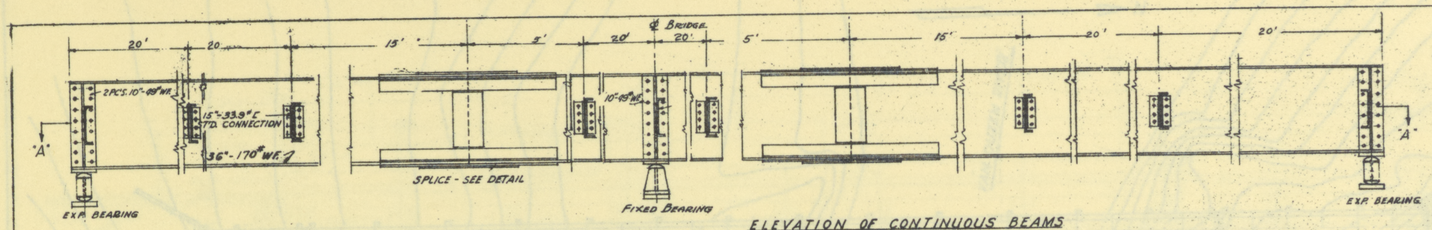


SECTION WEST PIER ½ ELEVATION

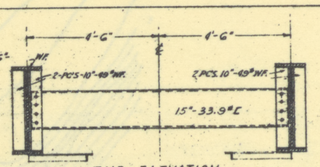
½ PLAN



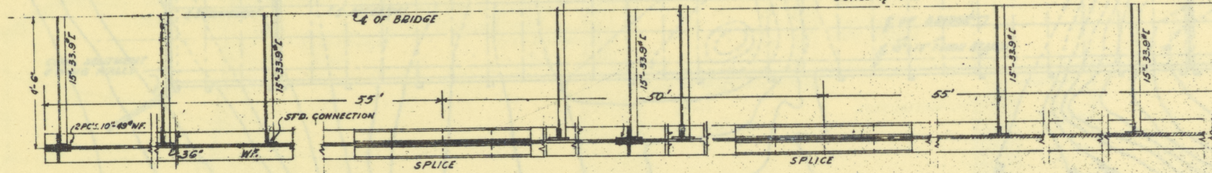

1'-6"
4'-6"
EL 1646.82'
2'-6"
2'-6"
2'-6"



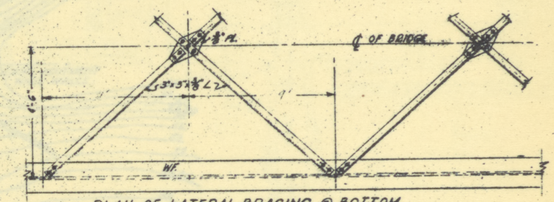
ELEVATION OF CONTINUOUS BEAMS
SCALE ½"=1'-0"



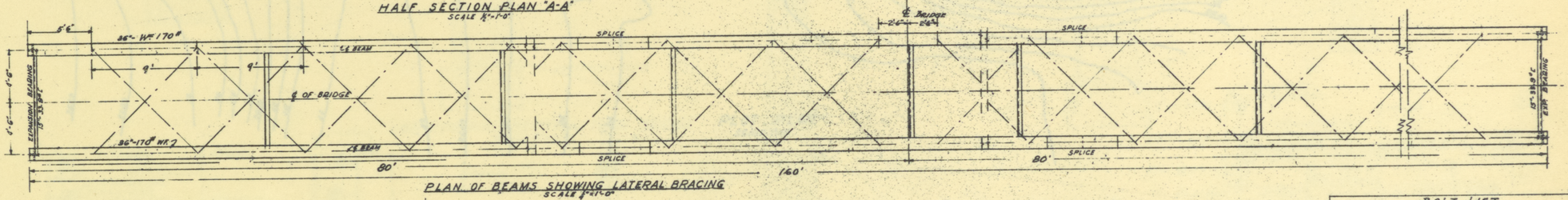
END ELEVATION
SCALE ½"=1'-0"



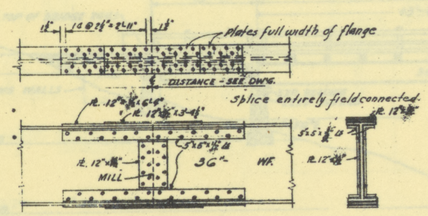
HALF SECTION PLAN "A-A"
SCALE ½"=1'-0"



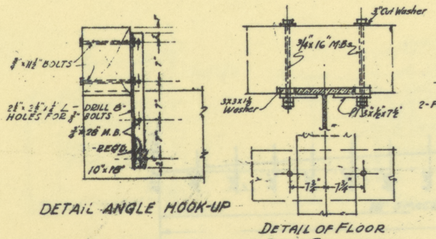
PLAN OF LATERAL BRACING @ BOTTOM
SCALE ½"=1'-0"



PLAN OF BEAMS SHOWING LATERAL BRACING
SCALE ½"=1'-0"

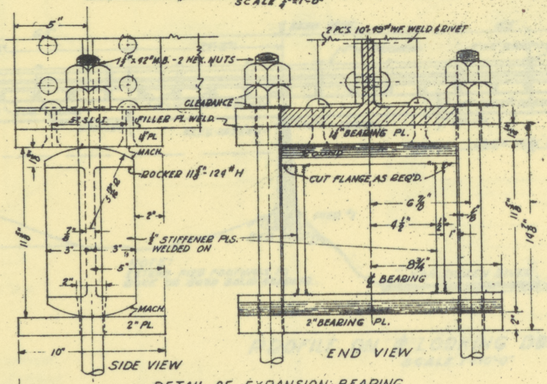


DETAIL OF GIRDER SPLICE



DETAIL ANGLE HOOK-UP

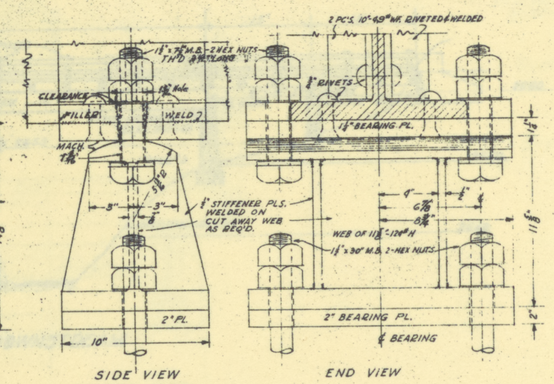
DETAIL OF FLOOR BEAM CONNECTION
Scale 1"=1'



SIDE VIEW

END VIEW

DETAIL OF EXPANSION BEARING
SCALE 3"=1'-0"



SIDE VIEW CENTER PIER

END VIEW

DETAIL OF FIXED BEARING
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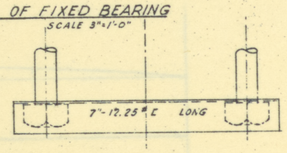
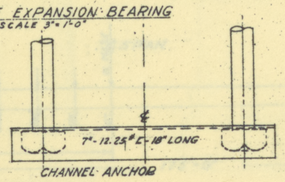




PART PLAN

CHANNEL ANCHOR

BOLT LIST

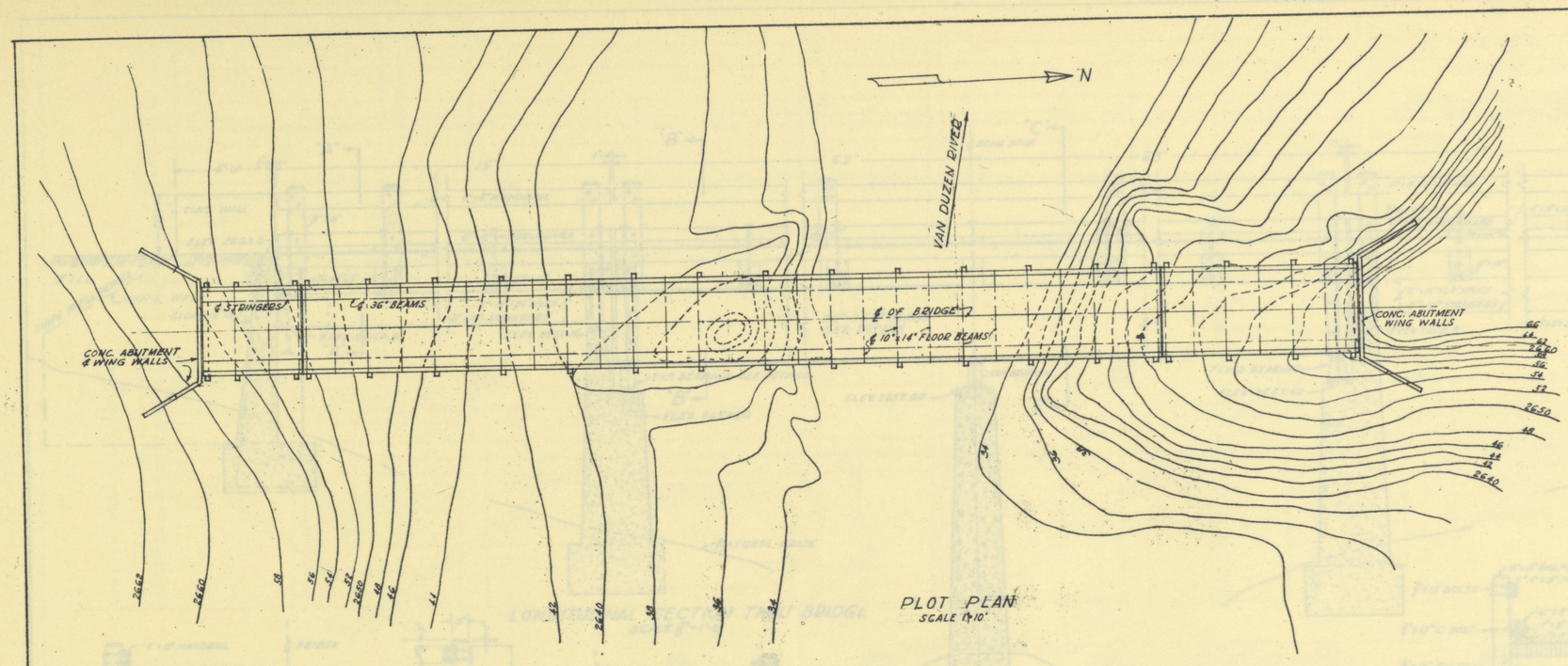
ITEM	No.	SIZE	KIND	NUTS	WASHERS
Anchors	8	1⅞x42	M.B.	2 Hex.	4-T.12#-C.G.
"	4	1⅞x30	"	"	8 " "
Pedestal to Beam	4	1⅞x7⅞	"	"	4 C.G.W.
Stringer-Anchors	4	¾x30	"	—	8-4x4x⅜
" "	4	¾x26	"		8- " "
"	16	¾x26	"		16 M.C.
" to Beam	16	¾x11½	"		16 M.C.
Wheel Guard to Beam	84	¾x31	"		168 M.C.
Wood Beam to Steel Beam	136	¾x16	"	2 Hex.	136-2x4x⅜ PL. 136-3x4x⅜ PL.
Wheel Guard to Posts	62	¾x17	C.B.		62 M.C.-62 P.W.
Beam to "	138	⅞x14	M.B.		276 M.C.
Wheel Guard Splice	14	¾x7½			28 M.C.
Hand Rail to Posts	132	½x13			264 "
Beam Ties	8	2⅞x2⅞x¼ x 2'-1"			

Notes
Holes for all field connections to be subpunched to 9/16" and reamed to a snug fit with ¾" rolled body bolts. All members to be match marked at connections.

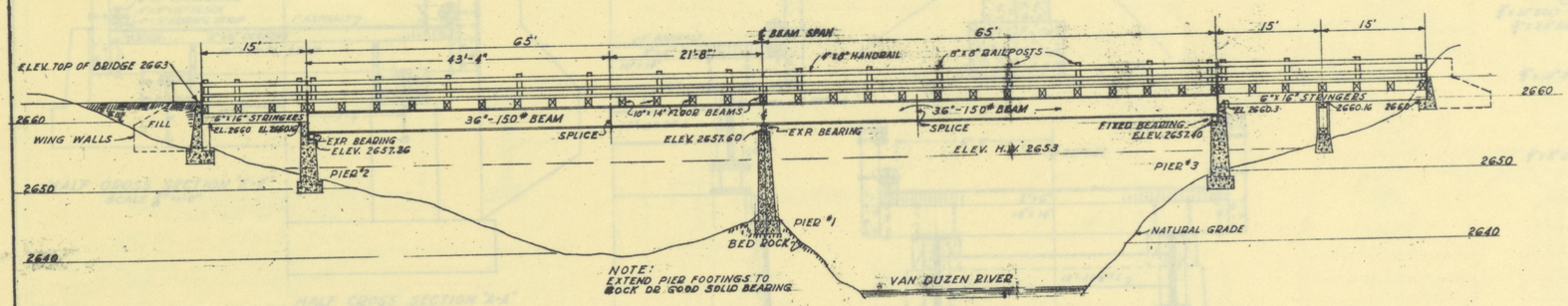
CONTINUOUS BEAM SPAN

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
BEAR RIVER BRIDGE
(DOG BAR)
LOADING H-15 ROADWAY 12'
TAHOE NATIONAL FOREST
SCALES: 1"=1'0" ¾"=1'
DATE: DEC. 12, 1934
DESIGNED DESIGN CHECKED DRAWN TRACED TRACING CHKED
J.B.L. N.F.M. E.A.M. E.A.M. N.F.M.
APPROVED BY:
SHEET 3 of 3 REGIONAL ENGINEER

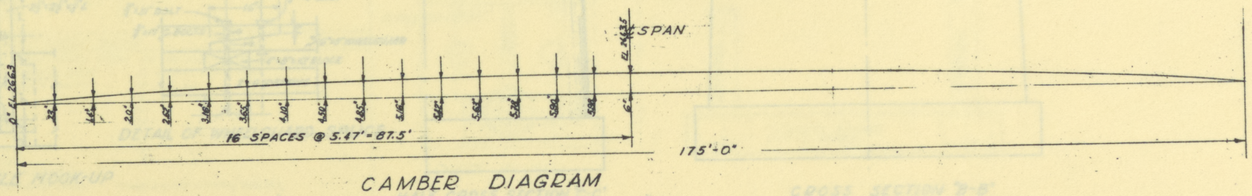
COBBEY, Geo. E. Lawrence
Bridge Engineer



PLOT PLAN
SCALE 1"=10'



PROFILE ON ℄ LOOKING DOWNSTREAM
SCALE 1"=10'-0"



CAMBER DIAGRAM

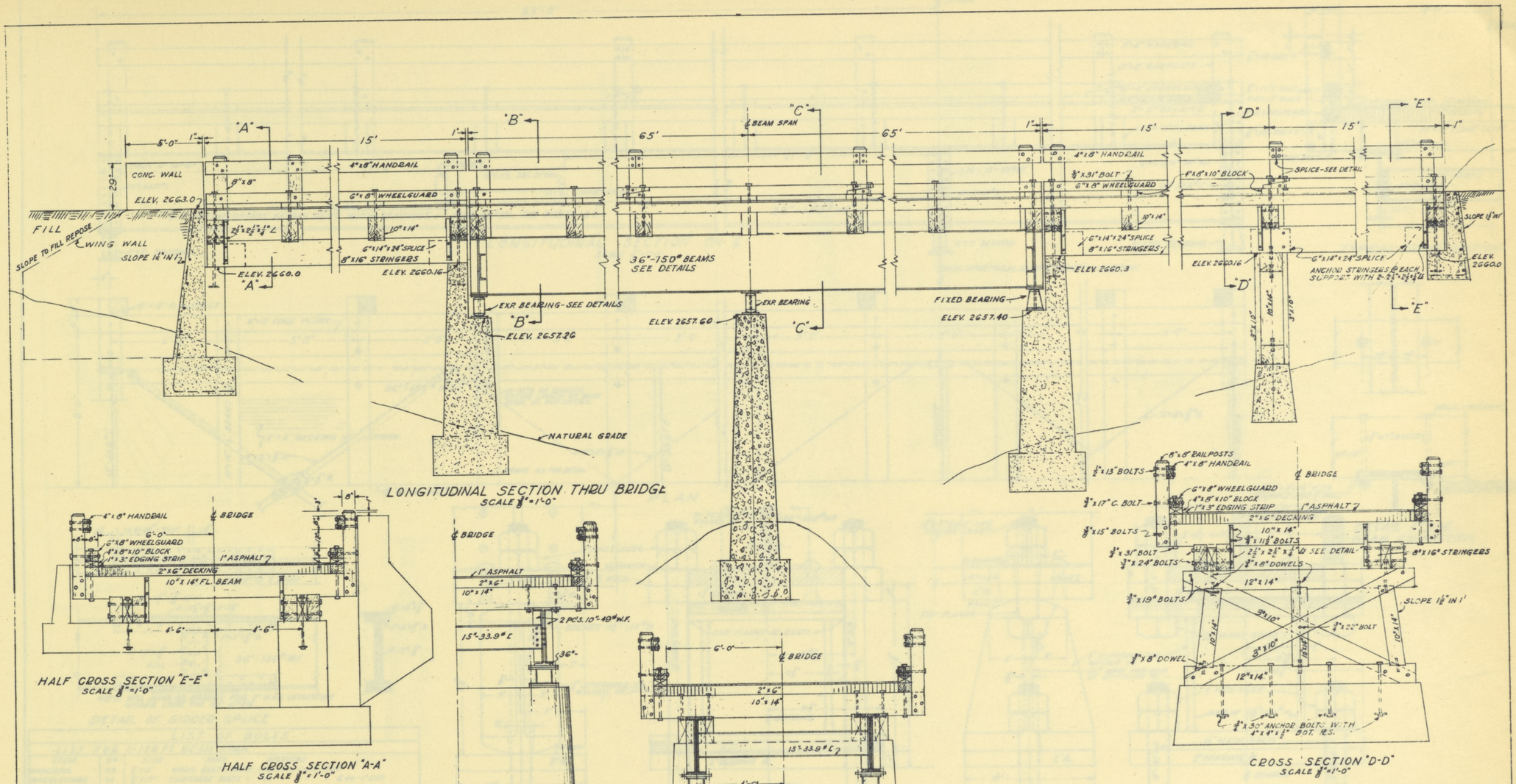
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

VAN DUZEN RIVER BRIDGE

LOADING H-15 ROADWAY 12'
TRINITY NATIONAL FOREST.

SCALES: 1"=10'
DATE: G-34
Designed J.H.L. Design Checked N.P.M. Drawn E.A.M. Traced Tracing Checked
Approved By: W. Kramer Regional Engineer
Sheet 1 of 1

CORRECT John H. Lawrence BRIDGE ENGINEER



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

VAN DUZEN RIVER BRIDGE

LOADING H-15 ROADWAY 12'
TRINITY NATIONAL FOREST

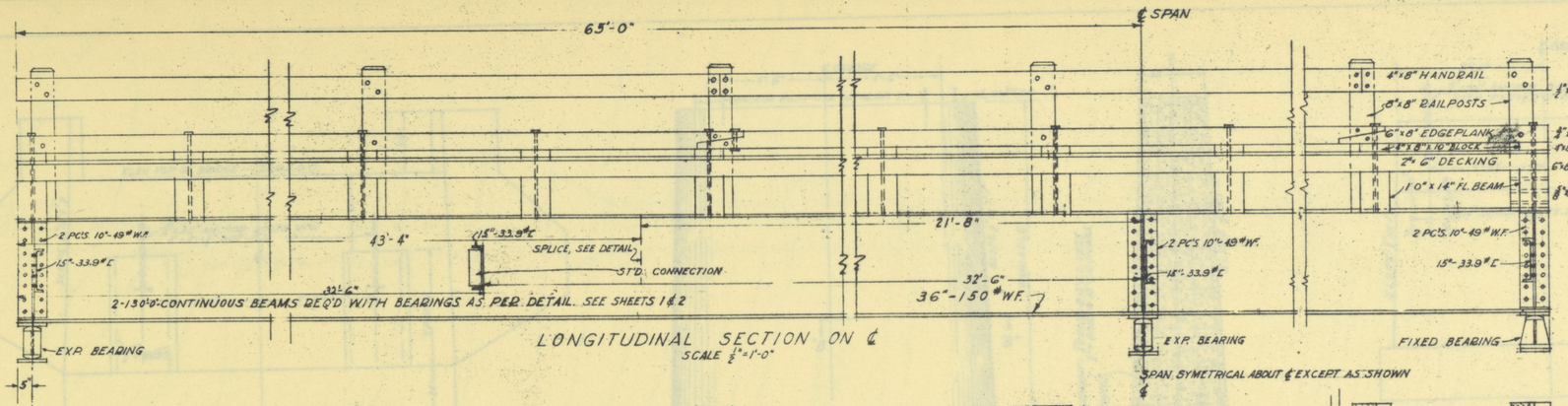
SCALES: ⅜"=1'
DATE: 6-34

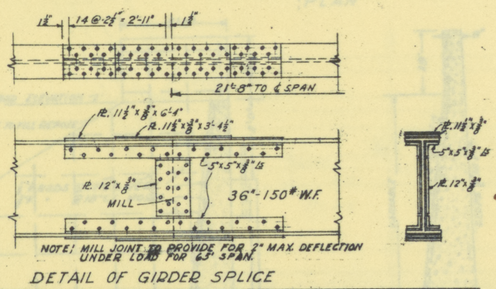
Designed	Design Checked	Drawn	Traced	Tracing Checked
J.H.L.	K.P.M.	E.A.K.		

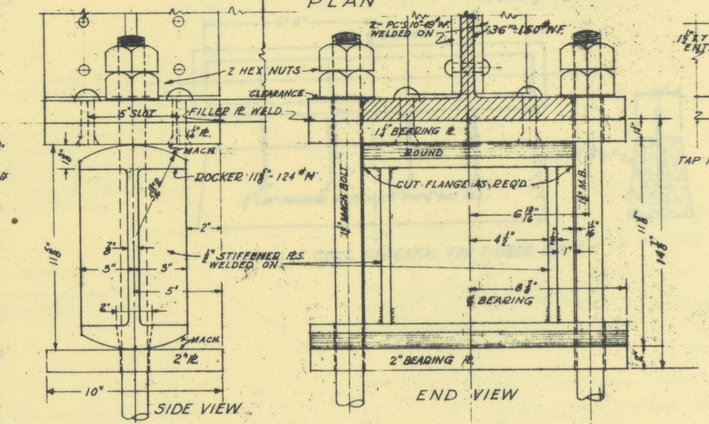
APPROVED BY:
REGIONAL ENGINEER

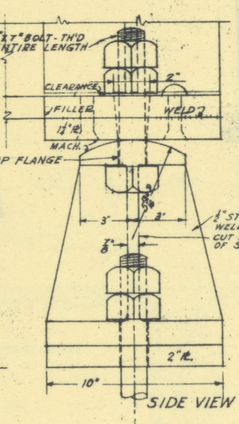
SHEET 2 OF 4

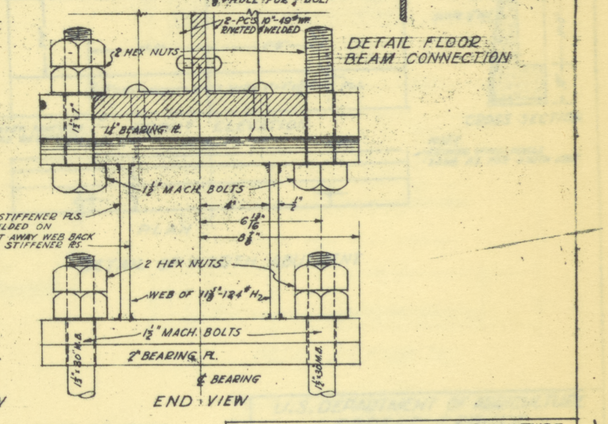
CORRECT: H. L. Lawrence
BRIDGE ENGINEER

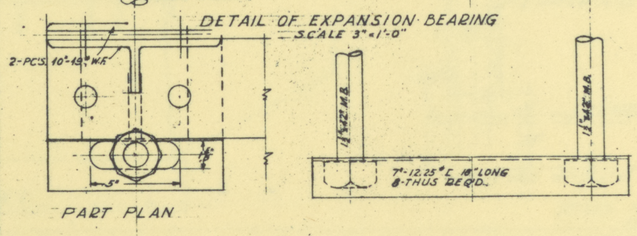












LIST OF BOLTS

LIST FOR 1-130 FT. BEAM SPAN

ITEM	NO.	SIZE	KIND	WASHERS
HANDRAIL	88	5/8"x13"	MACH. BOLTS	WITH 17G MAL. CAST IRON
WHEELGUARD	44	3/4"x17"	CARRIAGE BOLTS	" 44 " " " & 44-1" CUT
"	56	3/4"x13"	MACH. BOLTS	" 108 " " "
"	12	3/4"x7"	" "	" 24 " " "
RAILPOSTS	84	3/4"x15"	" "	" 168 " " "
FLOOR BEAMS	108	3/4"x17"	"	" 2 HEX. NUTS 108 " " 108-3"x3"&112-2 1/2"x3"x7 1/16"
BEARINGS	8	1 1/2"x7"	" "	" TH'D. ENTIRE LENGTH (SEE DWG.)
ANCHORS	8	1 1/2"x30"	" "	" " "
	8	1 1/2"x42"	" "	" " "

LIST FOR 3-15' TIMBER BAYS

HANDRAIL	32	5/8"x13"	MACH. BOLTS	WITH 64 MAL. CAST IRON
WHEELGUARD	16	3/4"x17"	CARRIAGE BOLTS	" 16-MAL. C.I. & 16-1" CUT
"	22	3/4"x13"	MACH. BOLTS	" 44-MAL. C.I.
"	2	3/4"x7"	" "	" 4 " "
RAILPOSTS	42	3/4"x15"	" "	" 84 " "
FLOOR BEAMS	20	3/4"x11 1/2"	" "	" 20 " "
STRINGERS	24	3/4"x24"	" "	" 24 " "
TIMBER BENT	8	3/4"x19"	" "	" 16 " "
" "	1	3/4"x22"	" "	" 2 " "
" "	8	3/4"x8"	DOWELS	
ANCHORS	12	3/4"x30"	MACH. BOLTS	" 12 MAL. C.I. & 12-4"x4"x1/2" BOT. PLS.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

VAN DUZEN RIVER BRIDGE

LOADING H-15 ROADWAY 12'
TRINITY NATIONAL FOREST

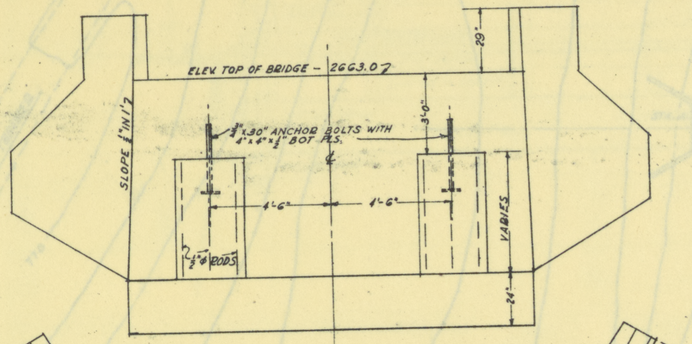
SCALES: 1/8"-1'&3"-1'
DATE: 6-34

Designed J.W.L. Design Checked H.F.M. Drawn Traced E.A.M. Tracing Checked

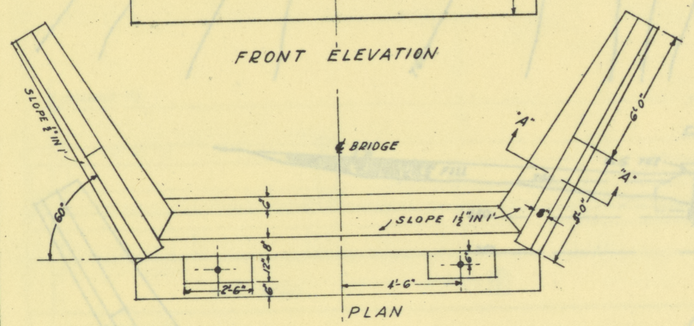
Approved By: E.W. Kramer
Regional Engineer

Sheet 3 of 4

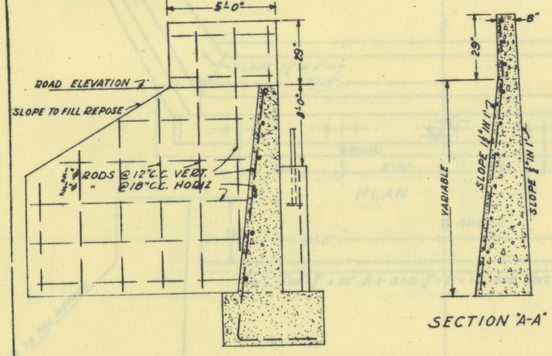
CORRECT: Edgar H. Lemmon
EDGAR H. LEMMON
REGIONAL ENGINEER



FRONT ELEVATION



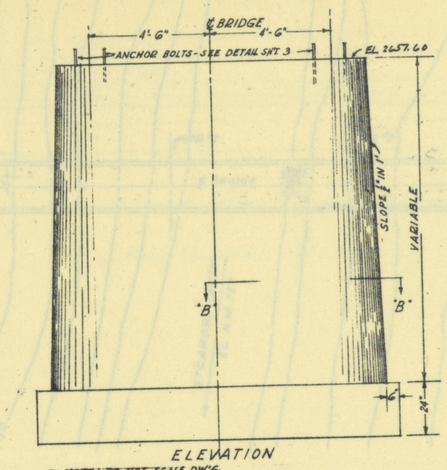
PLAN



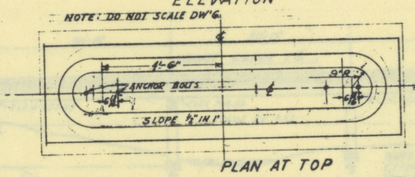
CROSS SECTION

SECTION "A-A"

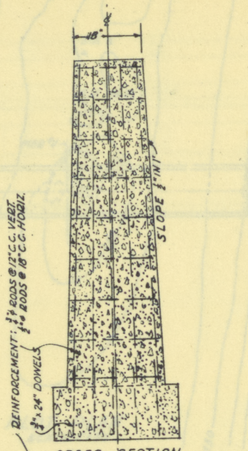
DETAIL OF SOUTH ABUTMENT
SCALE 3/8" = 1'-0"



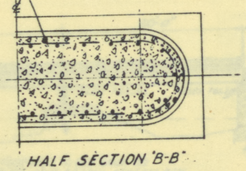
ELEVATION



PLAN AT TOP

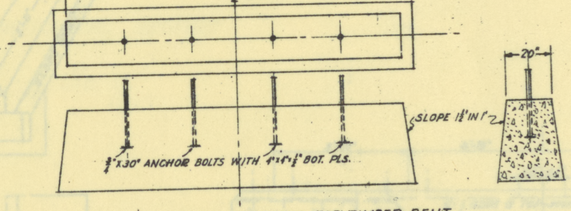


CROSS SECTION

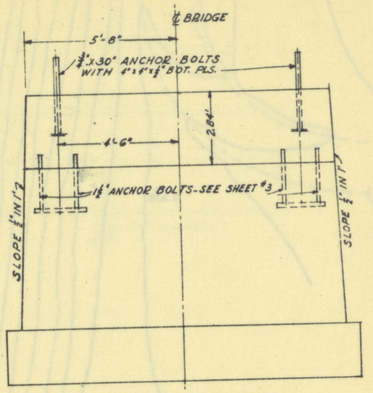


HALF SECTION "B-B"

DETAIL OF MAIN PIER No 1
SCALE 3/8" = 1'-0"



DETAIL OF CONC. PEDESTAL FOR TIMBER BENT



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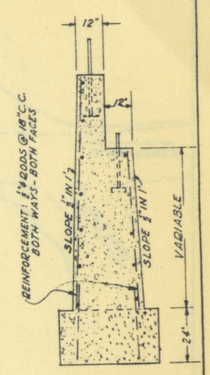

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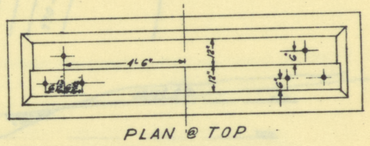
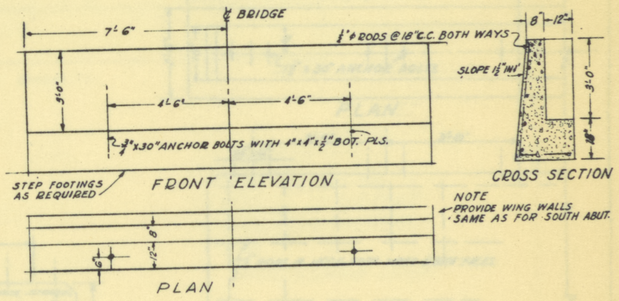


PLAN @ TOP
DETAIL OF PIERS 2 & 3



FRONT ELEVATION

CROSS SECTION

PLAN

DETAIL OF NORTH ABUTMENT

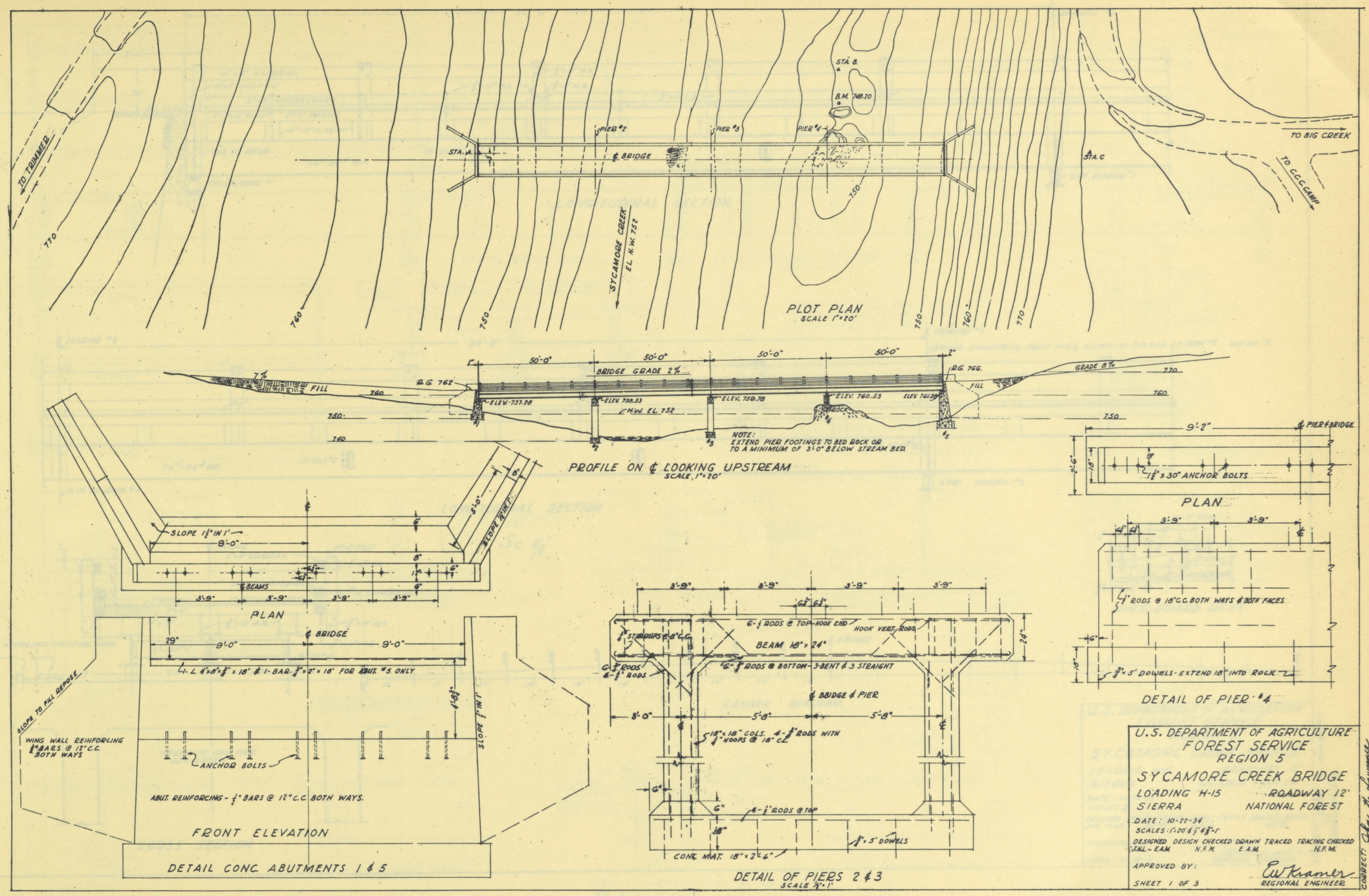
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

VAN DUZEN RIVER BRIDGE

LOADING H-15 ROADWAY 12'
TRINITY NATIONAL FOREST

SCALES: 1/2" = 1'-0"
DATE: 6-34
Designed J.M.L. Design Checked M.P.M. Drawn E.A.M. Traced Tracing Checked
Approved By: P. V. Kramer
Sheet 4 of 4 Regional Engineer

CORRECT: John H. Wiemann
DISTRICT ENGINEER



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

SYCAMORE CREEK BRIDGE

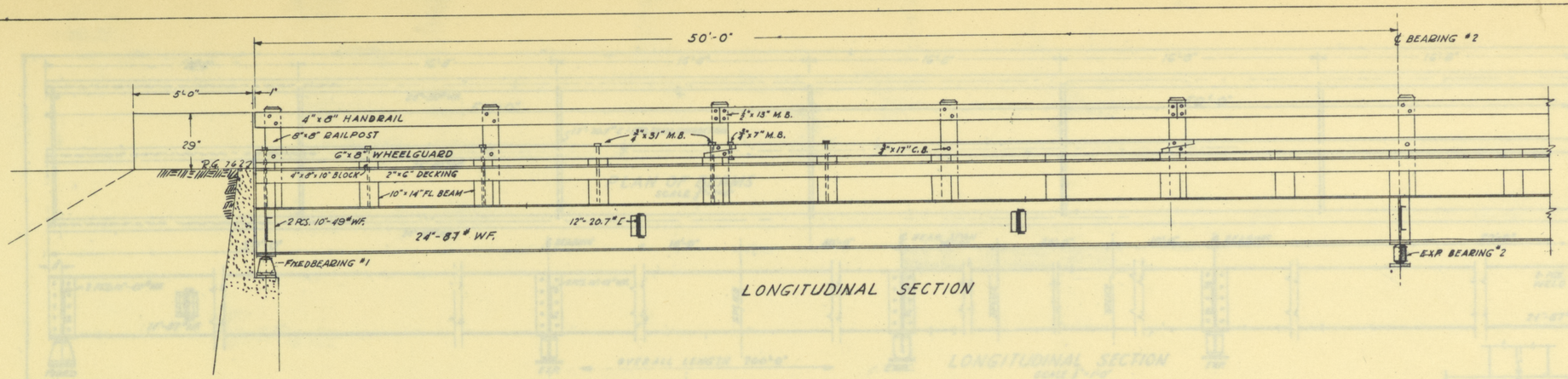
LOADING H-15 ROADWAY 12'
SIERRA NATIONAL FOREST

DATE: 10-22-34
SCALES: 1"=20' & ½" & ¾"=1'
DESIGNED J.A.L. — DESIGN CHECKED E.A.M. — DRAWN N.F.M. — TRACED — TRACING CHECKED N.F.M.

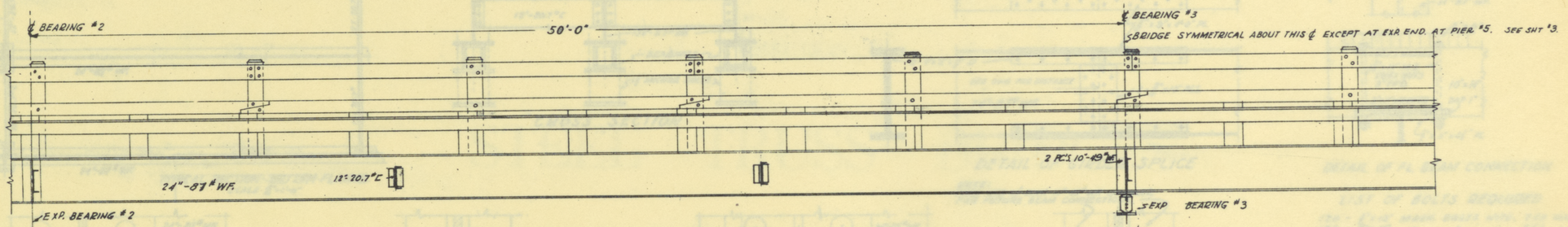
APPROVED BY: E.W. Kramer
REGIONAL ENGINEER

SHEET 1 OF 3

CORRECT: John H. Lawrence
BRIDGE ENGINEER.

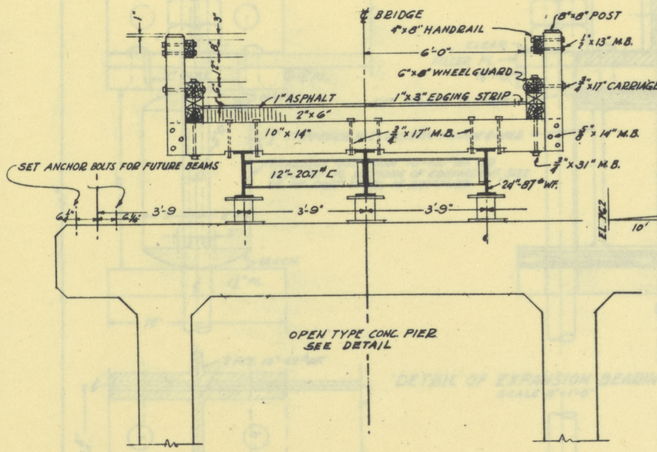


LONGITUDINAL SECTION

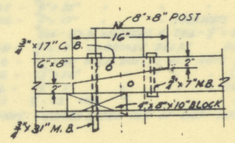


LONGITUDINAL SECTION

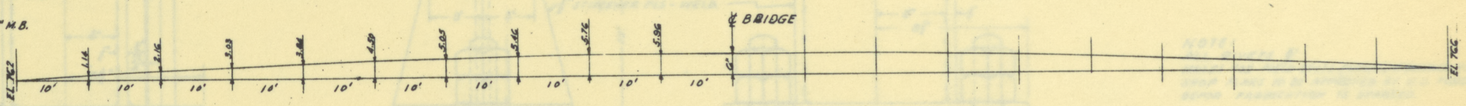
Sc 3/8"



CROSS SECTION



WHEELGUARD SPLICE



CAMBER DIAGRAM

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

SYCAMORE CREEK BRIDGE

LOADING H-15 ROADWAY 12'
SIERRA NATIONAL FOREST

DATE: 10-22-34
SCALES: ¾"=1'

DESIGNED	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED
J.H.L.-E.A.M.	N.F.M.	E.A.M.		N.F.M.

APPROVED BY:
E.W. Kramer
REGIONAL ENGINEER

SHEET 2 OF 3

CORRECT: John H. Lawrence
BRIDGE ENGINEER

STEEL TRUSS BRIDGES

PLAN OF BEAMS
SCALE 1/4"=1'-0"

LONGITUDINAL SECTION
SCALE 1/4"=1'-0"

CROSS SECTION

TYPICAL SECTION BOTTOM FLANGE
SCALE 3/8"=1'-0"

DETAIL OF GIRDER SPLICE

DETAIL OF FL. BEAM CONNECTION

DETAIL OF EXPANSION BEARING ~ 12 REQ'D.
SCALE 3"=1'-0"

PART PLAN

DETAIL OF EXPANSION JOINT AT PIER "5"
ONE REQUIRED.

DETAIL OF FIXED BEARING ~ 3 REQ'D.
SCALE 3"=1'-0"

NOTE:
PUNCH WEB OF EACH 10"-49# WF. SIMILAR FOR FUTURE BEAM CONNECTIONS.

LIST OF BOLTS REQUIRED

120 -	3/4" x 13"	MACH. BOLTS WITH	240	MAL. C.I. WASHERS
126 -	3/4" x 14"	" "	252	" " "
82 -	3/4" x 31"	" "	164	" " "
206 -	3/4" x 17"	" "	206	" " "
	206 - 3" x 3" WASHERS & 206 - 3/4" x 8" x 6 1/2" PLS. 3/4" ø HOLE - 1 1/2" FROM END.			
60 -	3/4" x 17"	CARRIAGE BOLTS	60 - M.C.I. & 60 - 1" - CUT WASHERS	
40 -	1 1/2" x 30"	MACH. BOLT - 2 HEX NUTS (BY OTHERS)		
10 -	1 1/2" x 24"	" " "	" "	
10 -	1 1/2" x 7"	" " "	TH'D. ENTIBE LENGTH	
13 -	3/8" x 22	chk "	13 - M.C.I. WASHERS	

NOTE: FURNISH EXTRA 10% OF LIST - WASHERS ONLY

NOTE:
ALL RIVETS 3/4"
HOLES FOR FIELD BOLTS PUNCHED & REAMED TO SNUG FIT.
SHOP PLANS TO BE APPROVED BY U.S. FOREST SERVICE BEFOR FABRICATION IS STARTED.

200 FT. CONTINUOUS BEAMS

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

SYCAMORE CREEK BRIDGE

LOADING H-15 ROADWAY 12'
SIERRA NATIONAL FOREST

DATE : 10-22-34
SCALES: 1"-1/8"-1/4"-3/16"
DESIGNED J.K.L. - E.A.M. DESIGN CHECKED NFM DRAWN E.A.M. TRACED TRACING CHECKED NFM

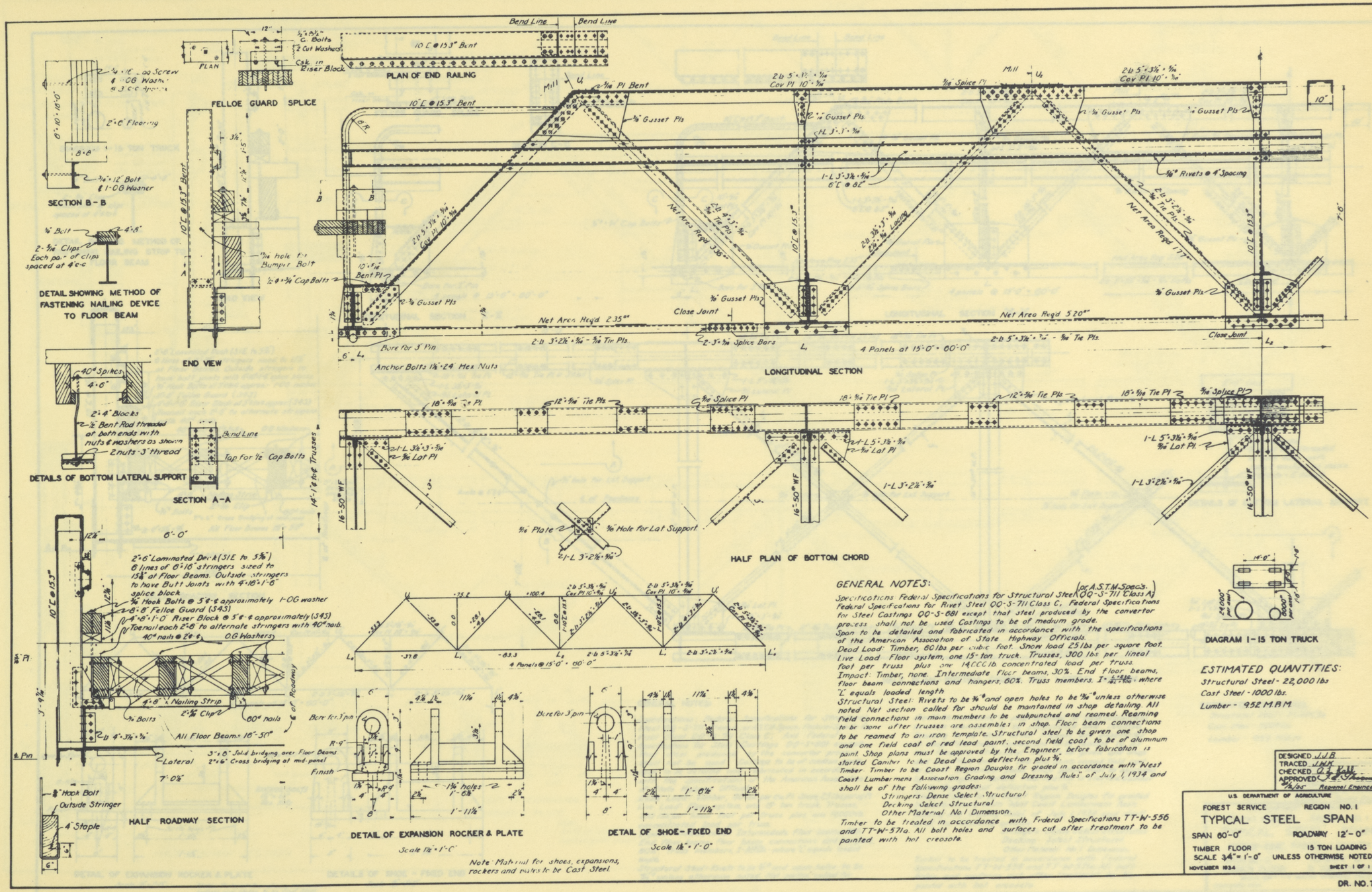
APPROVED. BY:
E.W. Kramer
REGIONAL ENGINEER

SHEET 3 OF 3

CORRECT: John H. Wilkinson
BRIDGE ENGINEER.

SECTION 4

STEEL TRUSS BRIDGES



GENERAL NOTES:

Specifications: Federal Specifications for Structural Steel (or A.S.T.M. Specs. QQ-S-711 Class A) Federal Specifications for Rivet Steel QQ-S-711 Class C, Federal Specifications for Steel Castings QQ-S-681 except that steel produced by the convertor process shall not be used Castings to be of medium grade.
Span to be detailed and fabricated in accordance with the specifications of the American Association of State Highway Officials.
Dead Load: Timber, 60 lbs per cubic foot. Snow load 25 lbs per square foot.
Live Load: Floor system, one 15-ton truck. Trusses, 300 lbs per lineal foot per truss plus one 14,000 lb concentrated load per truss.
Impact: Timber, none. Intermediate floor beams, 30%. End floor beams, floor beam connections and hangers, 60%. Truss members. $I = \frac{L+150}{4L+500}$, where "L" equals loaded length
Structural Steel: Rivets to be ¾" ø and open holes to be ⅞" ø unless otherwise noted. Net section called for should be maintained in shop detailing. All field connections in main members to be subpunched and reamed. Reaming to be done after trusses are assembled in shop. Floor beam connections to be reamed to an iron template. Structural steel to be given one shop and one field coat of red lead paint, second field coat to be of aluminum paint. Shop plans must be approved by the Engineer before fabrication is started. Camber to be Dead Load deflection plus ½".
Timber: Timber to be Coast Region Douglas fir graded in accordance with "West Coast Lumbermens Association Grading and Dressing Rules" of July 1, 1934 and shall be of the following grades:
Stringers: Dense Select Structural.
Decking: Select Structural.
Other Material: No 1 Dimension.
Timber to be treated in accordance with Federal Specifications TT-W-556 and TT-W-571a. All bolt holes and surfaces cut after treatment to be painted with hot creosote.

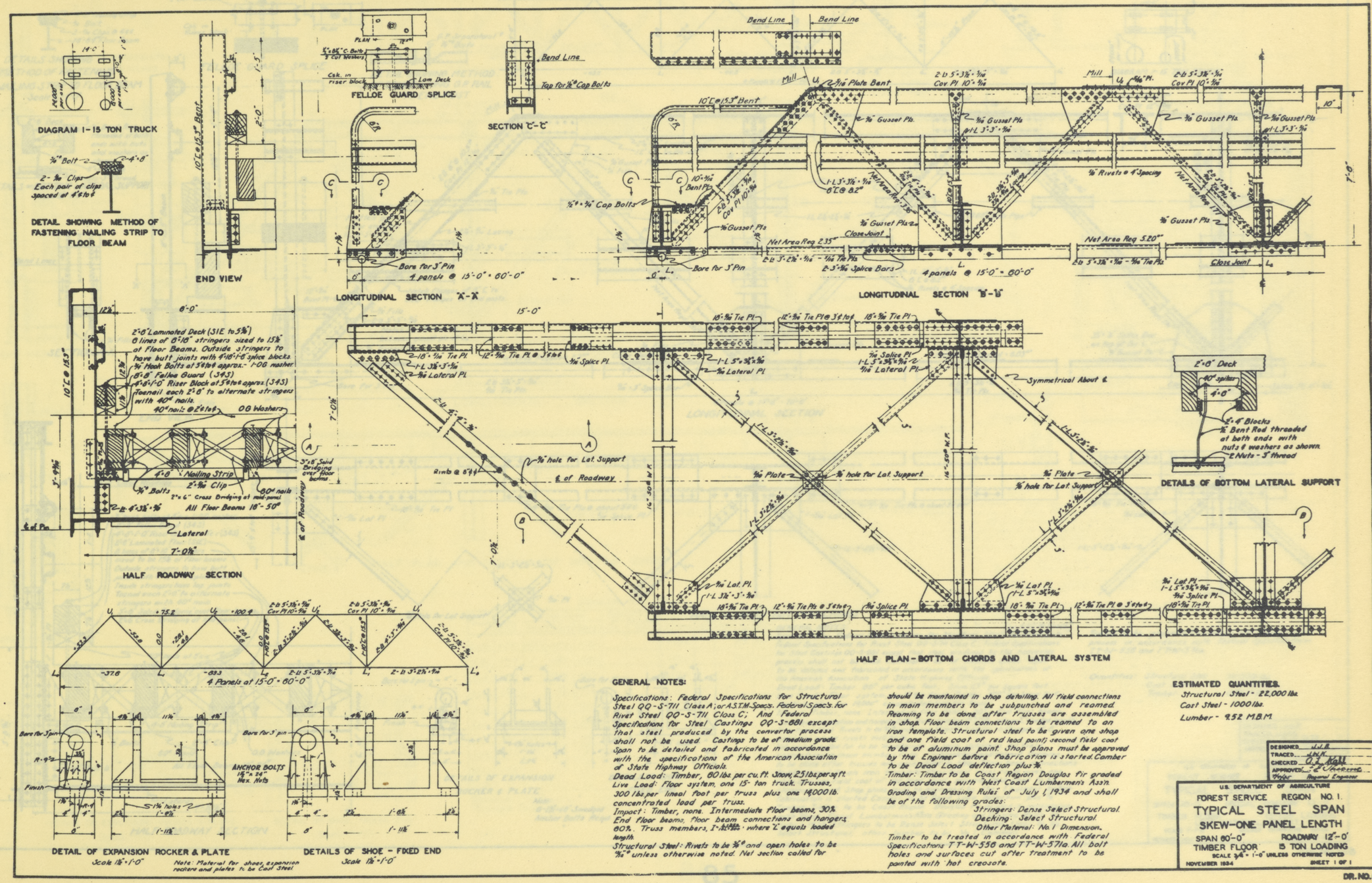
ESTIMATED QUANTITIES:

Structural Steel - 22,000 lbs
Cast Steel - 1000 lbs.
Lumber - 952 M.B.M.

DESIGNED J.J.B.
TRACED J.H.K.
CHECKED O.K. Fell
APPROVED J.C. Thompson
7/8/35 Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
TYPICAL STEEL SPAN
SPAN 60'-0" ROADWAY 12'-0"
TIMBER FLOOR 15 TON LOADING
SCALE 3/4"=1'-0" UNLESS OTHERWISE NOTED
NOVEMBER 1934 SHEET 1 OF 1

DR. NO. 78.



GENERAL NOTES:

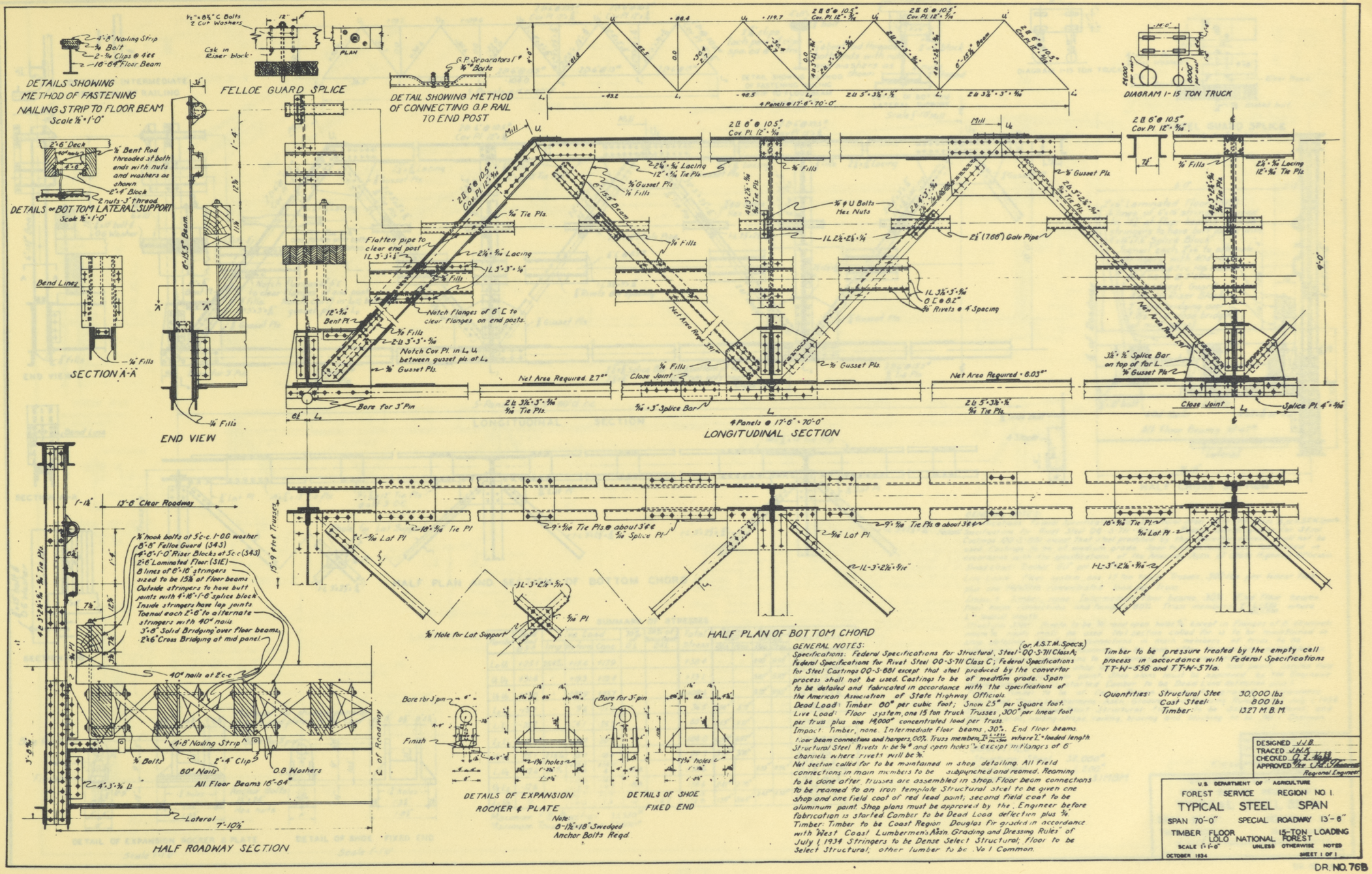
Specifications: Federal Specifications for Structural Steel QQ-S-711 Class A; or A.S.T.M. Specs. Federal Specs. for Rivet Steel QQ-S-711 Class C; And Federal Specifications for Steel Castings QQ-S-681 except that steel produced by the converter process shall not be used. Castings to be of medium grade. Span to be detailed and fabricated in accordance with the specifications of the American Association of State Highway Officials.
Dead Load: Timber, 60 lbs. per cu. ft. 3 inch, 25 lbs. per sq. ft.
Live Load: Floor system, one 15-ton truck. Trusses, 300 lbs. per lineal foot per truss plus one 14,000 lb. concentrated load per truss.
Impact: Timber, none. Intermediate floor beams, 30%. End floor beams, floor beam connections and hangers, 60%. Truss members, $I = \frac{50}{L+125}$ where L equals loaded length.
Structural Steel: Rivets to be ⅞" and open holes to be ⅞" unless otherwise noted. Net section called for should be maintained in shop detailing. All field connections in main members to be subpunched and reamed. Reaming to be done after trusses are assembled in shop. Floor beam connections to be reamed to an iron template. Structural steel to be given one shop and one field coat of red lead paint; second field coat to be of aluminum paint. Shop plans must be approved by the Engineer before fabrication is started. Camber to be Dead Load deflection plus ⅜".
Timber: Timber to be Coast Region Douglas fir graded in accordance with West Coast Lumbermen's Assn. Grading and Dressing Rules of July 1, 1934 and shall be of the following grades:
Stringers: Dense Select Structural.
Decking: Select Structural.
Other Material: No. 1 Dimension.
Timber to be treated in accordance with Federal Specifications TT-W-556 and TT-W-571a. All bolt holes and surfaces cut after treatment to be painted with hot creosote.

ESTIMATED QUANTITIES.
Structural Steel - 22,000 lbs.
Cast Steel - 1000 lbs.
Lumber - 9.52 M.B.M.

DESIGNED J.J.R.
TRACED J.M.K.
CHECKED O.J. Kirk
APPROVED C. A. Peterson
Forest Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1.
TYPICAL STEEL SPAN
SKEW-ONE PANEL LENGTH
SPAN 60'-0" ROADWAY 12'-0"
TIMBER FLOOR 15 TON LOADING
SCALE ¾" = 1'-0" UNLESS OTHERWISE NOTED
NOVEMBER 1934 SHEET 1 OF 1

DR. NO. 80.



GENERAL NOTES:

Specifications: Federal Specifications for Structural Steel 00-S-711 Class A; Federal Specifications for Rivet Steel 00-S-711 Class C; Federal Specifications for Steel Castings 00-S-88f except that steel produced by the converter process shall not be used. Castings to be of medium grade. Span to be detailed and fabricated in accordance with the specifications of the American Association of State Highway Officials (or A.S.T.M. Specs.)

Dead Load: Timber 60# per cubic foot; Snow 25# per Square foot.

Live Load: Floor system, one 15 ton truck Trusses, 300# per linear foot per truss plus one 14,000# concentrated load per truss.

Impact: Timber, none. Intermediate Floor beams 30%. End Floor beams floor beam connections and hangers 60%. Truss members $I=\frac{4,200,000}{l\text{ in ft}}$ where 'l' = loaded length.

Structural Steel: Rivets to be ¾" ø and open holes ⅞" except in flanges of [channels where rivets will be ⅞".

Net section called for to be maintained in shop detailing. All field connections in main members to be unpunched and reamed. Reaming to be done after trusses are assembled in shop. Floor beam connections to be reamed to an iron template. Structural steel to be given one shop and one field coat of red lead paint; second field coat to be aluminum paint. Shop plans must be approved by the Engineer before fabrication is started. Camber to be Dead Load deflection plus ⅜.

Timber: Timber to be Coast Region Douglas fir graded in accordance with "West Coast Lumbermen's Assn Grading and Dressing Rules" of July 1, 1934. Stringers to be Dense Select Structural; floor to be Select Structural; other lumber to be No. 1 Common.

Timber to be pressure treated by the empty cell process in accordance with Federal Specifications TT-W-556 and TT-W-571a.

Quantities:

Structural Stee	30,000 lbs
Cast Steel:	800 lbs
Timber:	1327 M.B.M.

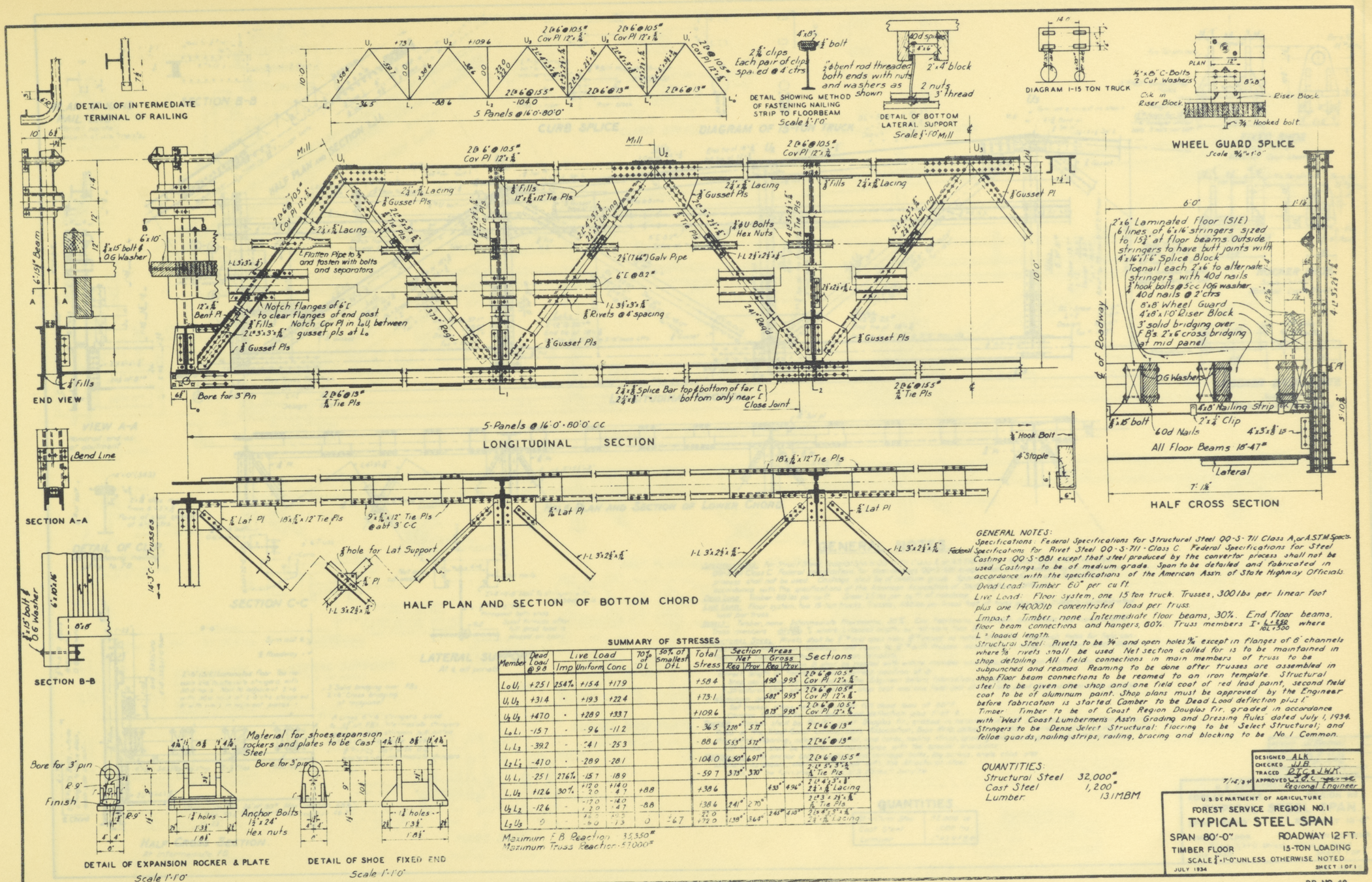
DESIGNED J.V.B.
TRACED J.W.K.
CHECKED G.T.H.
APPROVED for the U.S. Forester
Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1.

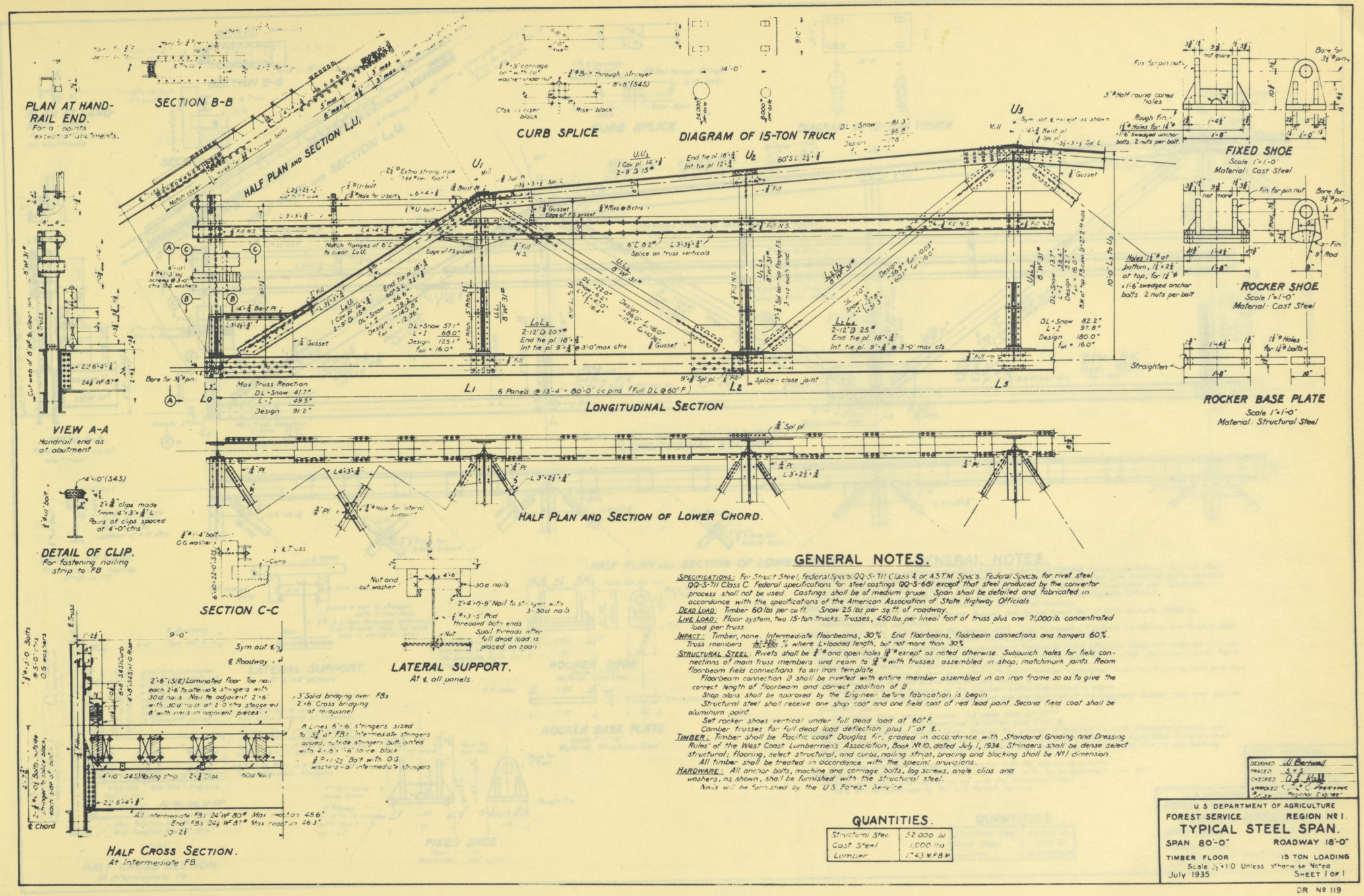
TYPICAL STEEL SPAN

SPAN 70'-0" SPECIAL ROADWAY 13'-6"
TIMBER FLOOR 15-TON LOADING
LOLO NATIONAL FOREST
SCALE 1"=1'-0" UNLESS OTHERWISE NOTED
OCTOBER 1934 SHEET 1 OF 1

DR. NO. 76B



Member	Dead Load @ 9.8	Live Load Imp	Live Load Uniform	Live Load Conc	70% of DL	30% of Smallest DtL	Total Stress	Section Areas Net Req	Net Prov	Gross Req	Gross Prov	Sections
L_0U_1	+251	254%	+154	+179			+584			496#	995#	2 ⌐ 6"@ 10.5# Cov Pl 12"x⅝"
U_1U_2	+314	·	+193	+224			+731			582#	993#	2 ⌐ 6"@ 10.5# Cov Pl 12"x⅝"
U_2U_3	+470	·	+289	+337			+1096			873#	985#	2 ⌐ 6"@ 10.5# Cov Pl 12"x⅝"
L_0L_1	-157	·	-96	-112			-365	270#	577#			2 ⌐ 6"@ 13#
L_1L_2	-392	·	-241	-253			-886	553#	577#			2 ⌐ 6"@ 13#
L_2L_2'	-410	·	-289	-281			-1040	650#	697#			2 ⌐ 6"@ 15.5#
U_1L_1	-251	276%	-157	189			-597	375#	370#			2 L 5"x3½"x⅝" ⅝" Tie Pls
L_1U_2	+126	30%	+120 / -20	+140 / -47	+88		+386			435#	496#	2 L 4"x3½"x⅝" 2½"x⅝" Lacing
U_2L_2	-126	·	-170 / +20	-140 / -47	-88		+386	241#	270#			2 L 3"x2½"x⅝" ⅝" Tie Pls
L_2U_3	0	·	±90	-13	0	467	272 / +772	138#	568#	248#	493#	2 L 3"x2½"x⅝" 2½"x⅝" Lacing



GENERAL NOTES.

SPECIFICATIONS: For Struct Steel, Federal Specs QQ-S-711 Class A or ASTM Specs. Federal Specs, for rivet steel QQ-S-711 Class C. Federal specifications for steel castings QQ-S-681 except that steel produced by the converter process shall not be used. Castings shall be of medium grade. Span shall be detailed and fabricated in accordance with the specifications of the American Association of State Highway Officials.

DEAD LOAD: Timber 60 lbs per cu ft. Snow 25 lbs per sq ft. of roadway.

LIVE LOAD: Floor system, two 15-ton trucks. Trusses, 450 lbs per lineal foot of truss plus one 21,000 lb. concentrated load per truss.

IMPACT: Timber, none. Intermediate floorbeams, 30%. End floorbeams, floorbeam connections and hangers 60%. Truss members $\frac{300}{100+L}$ % where L=loaded length, but not more than 30%.

STRUCTURAL STEEL: Rivets shall be ⅞" ø and open holes ⅞" ø except as noted otherwise. Subpunch holes for field connections of main truss members and ream to ⅞" ø with trusses assembled in shop; matchmark joints. Ream floorbeam field connections to an iron template.

Floorbeam connection ∠s shall be riveted with entire member assembled in an iron frame so as to give the correct length of floorbeam and correct position of ∠s.

Shop plans shall be approved by the Engineer before fabrication is begun.

Structural steel shall receive one shop coat and one field coat of red lead paint. Second field coat shall be aluminum paint.

Set rocker shoes vertical under full dead load at 60° F.

Camber trusses for full dead load deflection plus 1" at ℄.

TIMBER: Timber shall be Pacific coast Douglas fir, graded in accordance with "Standard Grading and Dressing Rules" of the West Coast Lumbermens Association, Book № 10, dated July 1, 1934. Stringers shall be dense select structural; flooring, select structural, and curbs, nailing strips, bracing and blocking shall be № 1 dimension.

All timber shall be treated in accordance with the special provisions.

HARDWARE: All anchor bolts, machine and carriage bolts, lag screws, angle clips and washers, as shown, shall be furnished with the structural steel.

Nails will be furnished by the U.S. Forest Service.

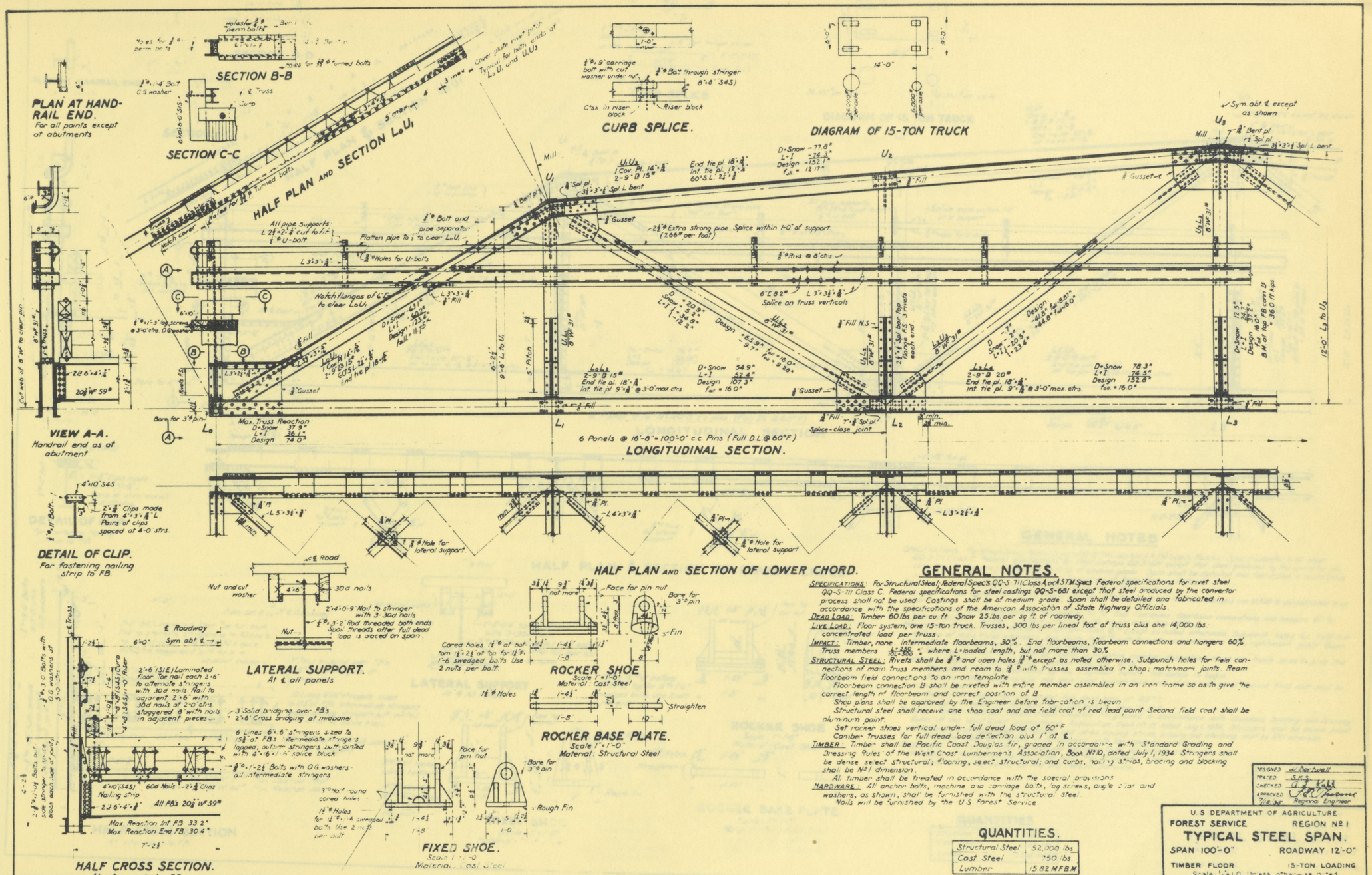
QUANTITIES.

Structural Steel	52,000 lbs
Cast Steel	1,000 lbs
Lumber	17.43 M FBM

DESIGNED W. Bertwell
TRACED S.K.S.
CHECKED O.J. Kell
APPROVED [illegible] Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE. REGION № 1.
TYPICAL STEEL SPAN.
SPAN 80'-0" ROADWAY 18'-0"
TIMBER FLOOR 15 TON LOADING
Scale ½"=1'0 Unless otherwise Noted
July 1935 SHEET 1 OF 1

DR № 119



GENERAL NOTES.

SPECIFICATIONS: For Structural Steel, Federal Spec's QQ-S-711 Class A, or A.S.T.M. Spec's Federal specifications for rivet steel QQ-S-711 Class C. Federal specifications for steel castings QQ-S-681 except that steel produced by the convertor process shall not be used. Castings shall be of medium grade. Span shall be detailed and fabricated in accordance with the specifications of the American Association of State Highway Officials.

DEAD LOAD: Timber 60 lbs per cu. ft. Snow 25 lbs. per sq. ft. of roadway.

LIVE LOAD: Floor system, one 15-ton truck. Trusses, 300 lbs. per lineal foot of truss plus one 14,000 lbs. concentrated load per truss.

IMPACT: Timber, none. Intermediate floorbeams, 30%. End floorbeams, floorbeam connections and hangers 60%. Truss members $\frac{L+250}{2L+500}$% where L=loaded length, but not more than 30%.

STRUCTURAL STEEL: Rivets shall be ⅞" ϕ and open holes ⅞" ϕ except as noted otherwise. Subpunch holes for field connections of main truss members and ream to ⅞" ϕ with trusses assembled in shop; matchmark joints. Ream floorbeam field connections to an iron template.

Floorbeam connection L₂ shall be riveted with entire member assembled in an iron frame so as to give the correct length of floorbeam and correct position of L₂.

Shop plans shall be approved by the Engineer before fabrication is begun.

Structural steel shall receive one shop coat and one field coat of red lead paint. Second field coat shall be aluminum paint.

Set rocker shoes vertical under full dead load at 60°F.

Camber trusses for full dead load deflection plus 1" at ℄.

TIMBER: Timber shall be Pacific Coast Douglas fir, graded in accordance with "Standard Grading and Dressing Rules" of the West Coast Lumbermen's Association, Book No. 10, dated July 1, 1934. Stringers shall be dense select structural; flooring, select structural; and curbs, nailing strips, bracing and blocking shall be No. 1 dimension.

All timber shall be treated in accordance with the special provisions.

HARDWARE: All anchor bolts, machine and carriage bolts, lag screws, a/g'e c'sk and washers, as shown, shall be furnished with the structural steel.

Nails will be furnished by the U.S. Forest Service.

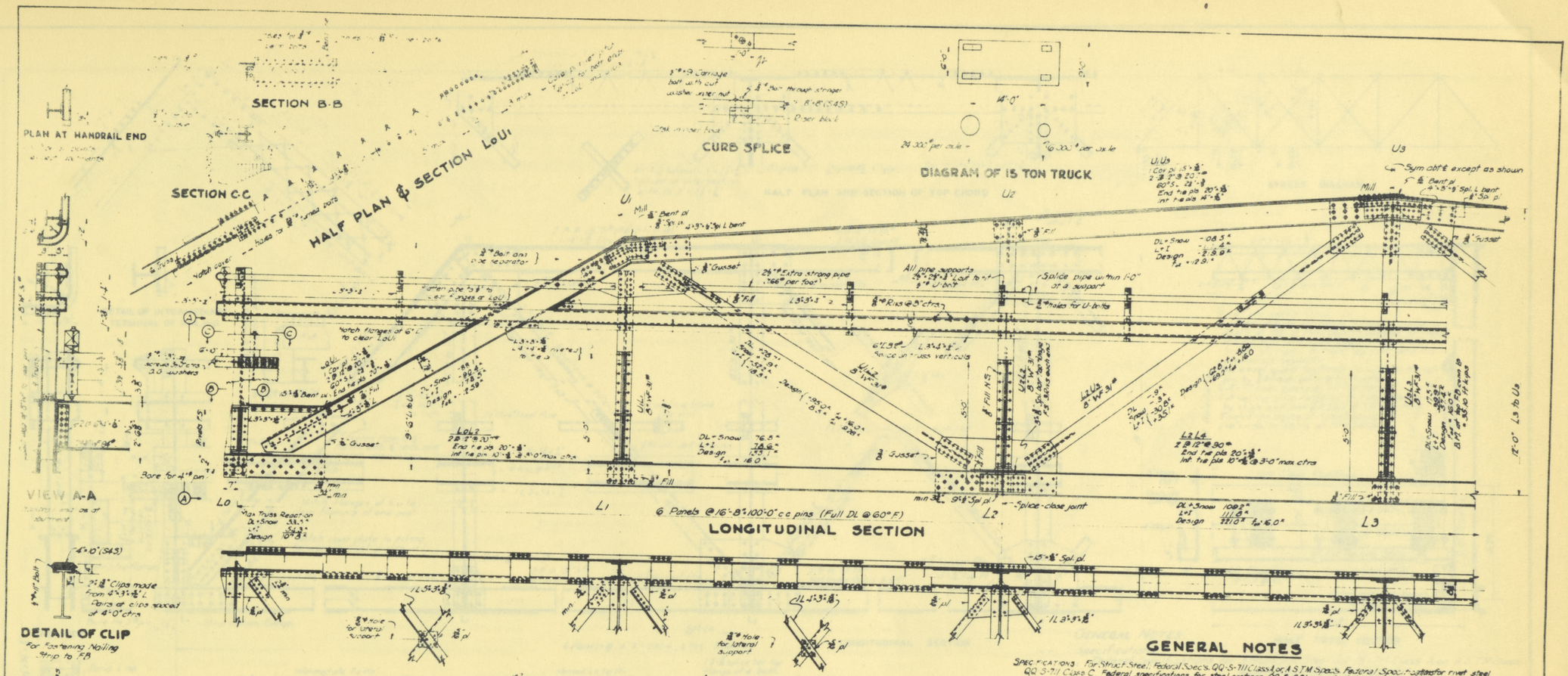
QUANTITIES.

Structural Steel	52,300 lbs.
Cast Steel	750 lbs.
Lumber	15.82 M.F.B.M.

DESIGNED W. Bartwell
TRACED S.R.S.
CHECKED H.A.K.
APPROVED [signature] Regional Engineer
7/6/35

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No. 1
TYPICAL STEEL SPAN.
SPAN 100'-0" ROADWAY 12'-0"
TIMBER FLOOR 15-TON LOADING
Scale ½"=1'-0" Unless otherwise noted
July 1935 SHEET 1 OF 1

DR No. 118



GENERAL NOTES

SPECIFICATIONS: For Structural Steel, Federal Specs. QQ-S-711 Class I or A.S.T.M. Specs. Federal Specs. to be used for rivet steel QQ-S-711 Class C. Federal specifications for steel castings QQ-S-681 except that steel produced by the converter process shall not be used. Castings shall be of medium grade. Span shall be detailed and fabricated in accordance with the specifications of the American Association of State Highway Officials.

DEAD LOAD: Timber 60 lbs per cu. ft. Snow 25 lbs per sq. ft. of roadway.

LIVE LOAD: Floor system, two 15-ton trucks. Trusses, 450 lbs per lineal foot of truss plus one 21,000 lb concentrated load per truss.

IMPACT: Timber, none. Intermediate floorbeams, 30 %. End floorbeams, floorbeam connections and hangers 60 %.

Truss members $\frac{50}{L+125}$ % where L = loaded length, but not more than 30 %.

STRUCTURAL STEEL: Rivets shall be ⅞" ø and open holes ⅞" ø except as noted otherwise. Subpunch holes for field connections of main truss members and ream to ⅞" ø with trusses assembled in shop; matchmark joints. Ream floorbeam field connections to an iron template.

Floorbeam connections shall be riveted with entire member assembled in an iron frame so as to give the correct length of floorbeam and correct position of ℄.

Shop plans shall be approved by the Engineer before fabrication is begun.

Structural steel shall receive one shop coat and one field coat of red lead paint. Second field coat shall be aluminum paint.

Set rocker shoes vertical under full dead load at 60° F.

Camber trusses for full dead load deflection plus 1" at ℄.

TIMBER: Timber shall be Pacific coast Douglas fir, graded in accordance with "Standard Grading and Dressing Rules" of the West Coast Lumbermen's Association, Book No. 10, dated July 1, 1934. Stringers shall be dense select structural; flooring, select structural; and curbs, nailing strips, bracing and blocking shall be No. 1 dimension.

All timber shall be treated in accordance with the special provisions.

HARDWARE: All anchor bolts, machine and carriage bolts, lag screws, angle clips and washers, as shown, shall be furnished with the structural steel.

Nails will be furnished by the U.S. Forest Service.

QUANTITIES

Structural Steel	67 000 lbs
Cast Steel	1,350 lbs
Lumber	2318 M FBM

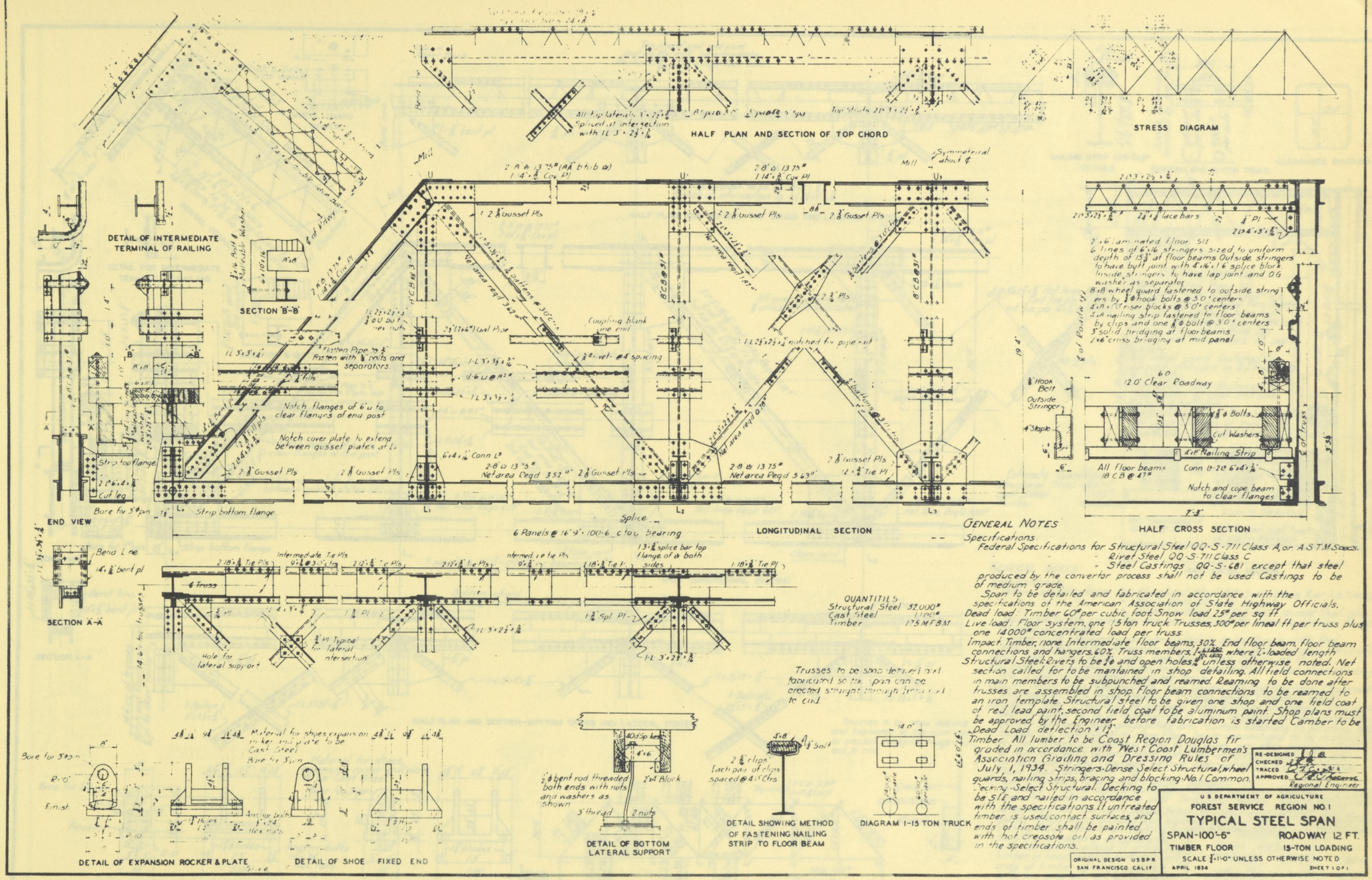
DESIGNED WLB
TRACED WLB
CHECKED O.J. Kahl
APPROVED [illegible]
Regional Engineer

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No. 1

TYPICAL STEEL SPAN

SPAN 100'-0" ROADWAY 18'-0"
TIMBER FLOOR 15 TON LOADING
Scale ½"=1'-0" Unless otherwise Noted
JUNE 1935 SHEET 1 OF 1

DR. No. 170



General Notes

Specifications.
Federal Specifications for Structural Steel QQ-S-711 Class A, or A.S.T.M. Specs.
" " Rivet Steel QQ-S-711 Class C
" " Steel Castings QQ-S-681 except that steel produced by the convertor process shall not be used Castings to be of medium grade.
Span to be detailed and fabricated in accordance with the specifications of the American Association of State Highway Officials.
Dead load: Timber 60# per cubic foot Snow load 25# per sq ft.
Live load. Floor system, one 15 ton truck Trusses, 300# per lineal ft per truss plus one 14000# concentrated load per truss.
Impact Timber, none Intermediate floor beams, 30% End floor beam, floor beam connections and hangers, 60% Truss members, $I = \frac{150}{L+160}$ where L=loaded length
Structural Steel: Rivets to be ⅞" and open holes 1" unless otherwise noted. Net section called for to be maintained in shop detailing. All field connections in main members to be subpunched and reamed. Reaming to be done after trusses are assembled in shop. Floor beam connections to be reamed to an iron template. Structural steel to be given one shop and one field coat of red lead paint, second field coat to be aluminum paint. Shop plans must be approved by the Engineer before fabrication is started. Camber to be Dead Load deflection + ½".
Timber. All lumber to be Coast Region Douglas fir graded in accordance with West Coast Lumbermen's Association Grading and Dressing Rules of July 1, 1934. Stringers-Dense Select Structural, wheel guards, nailing strips, bracing and blocking-No.1 Common. Decking-Select Structural. Decking to be S1E and nailed in accordance with the specifications. If untreated timber is used, contact surfaces and ends of timber shall be painted with hot creosote oil as provided in the specifications.

Trusses to be shop detailed and fabricated so the span can be erected straight through from end to end.

QUANTITIES
Structural Steel 32,000#
Cast Steel 1,100#
Timber 175 M F.B.M.

2" x 6" laminated Floor SIE
6 lines of 6"x16" stringers sized to uniform depth of 15⅜" at floor beams. Outside stringers to have butt joint with 4"x16"x1'6" splice block. Inside stringers to have lap joint and 0.6 washers as separator.
B.&B. wheel guard fastened to outside stringers by ⅞" ϕ hook bolts @ 5'0" centers.
4"x8" riser blocks @ 5'0" centers.
4"x8" nailing strip fastened to floor beams by clips and one ⅞" ϕ bolt @ 3'0" centers.
3" solid bridging at floor beams.
2"x6" cross bridging at mid panel.

RE-DESIGNED	
CHECKED	
TRACED	
APPROVED	Regional Engineer

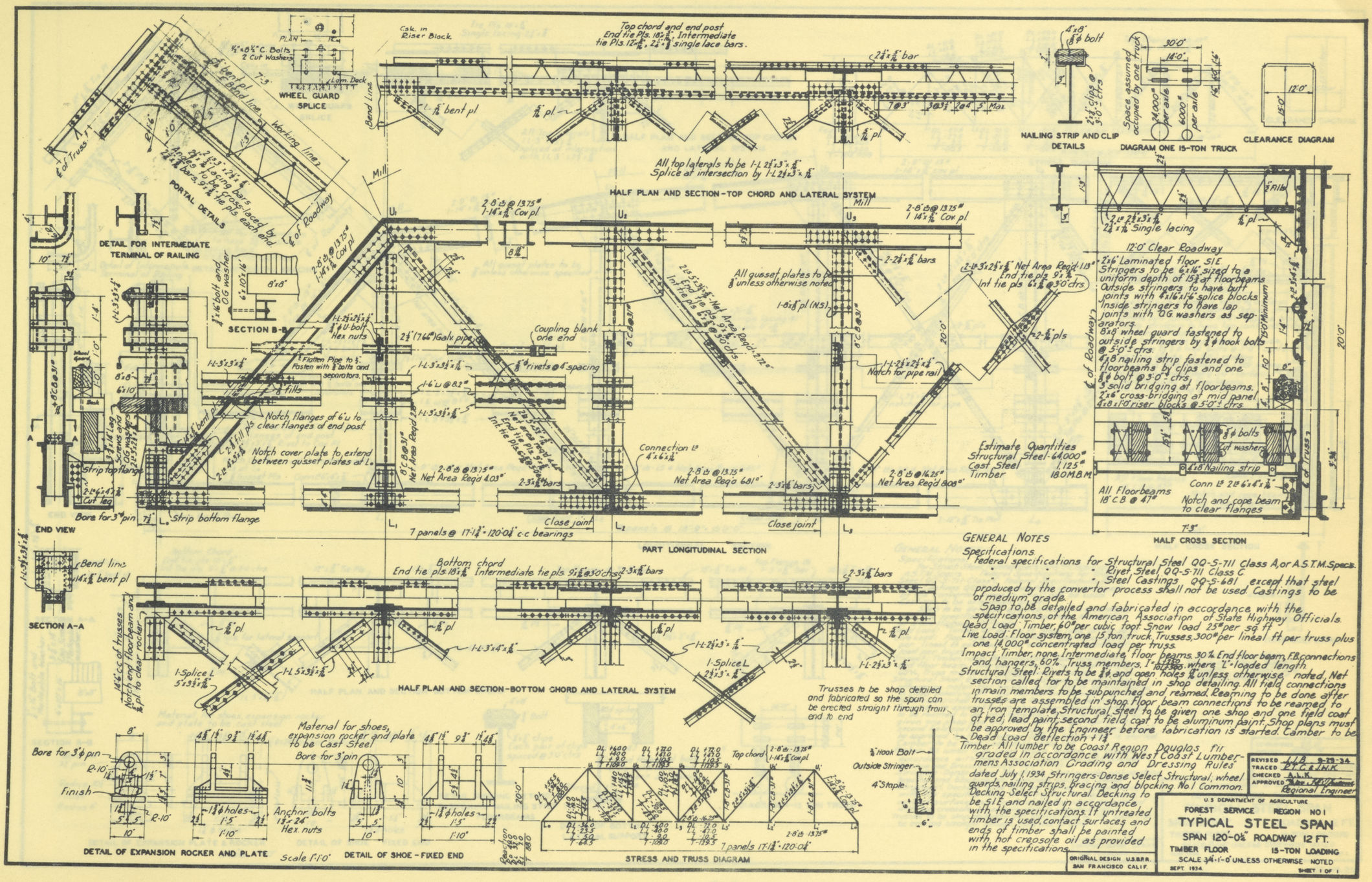
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1

TYPICAL STEEL SPAN

SPAN-100'-6" ROADWAY 12 FT.
TIMBER FLOOR 15-TON LOADING
SCALE 1"=1'-0" UNLESS OTHERWISE NOTED
APRIL 1934 SHEET 1 OF 1

ORIGINAL DESIGN U.S.B.P.R. SAN FRANCISCO CALIF.

DR. NO 23



GENERAL NOTES

Specifications

Federal specifications for Structural Steel QQ-S-711 class A, or A.S.T.M. Specs.
" " " Rivet Steel QQ-S-711 Class C
" " " Steel Castings QQ-S-681 except that steel produced by the convertor process shall not be used. Castings to be of medium grade.

Span to be detailed and fabricated in accordance with the specifications of the American Association of State Highway Officials.

Dead Load: Timber, 60# per cubic foot Snow load 25# per sq ft.

Live Load: Floor system, one 15 ton truck. Trusses, 300# per lineal ft per truss plus one 14,000# concentrated load per truss.

Impact: Timber, none. Intermediate floor beams, 30%. End floor beam, F.B. connections and hangers, 60%. Truss members, $I = \frac{150}{L+320}$, where "L" = loaded length.

Structural Steel: Rivets to be ¾" ϕ and open holes ⅞" unless otherwise noted. Net section called for to be maintained in shop detailing. All field connections in main members to be subpunched and reamed. Reaming to be done after trusses are assembled in shop. Floor beam connections to be reamed to an iron template. Structural steel to be given one shop and one field coat of red lead paint; second field coat to be aluminum paint. Shop plans must be approved by the Engineer before fabrication is started. Camber to be Dead Load deflection + ½".

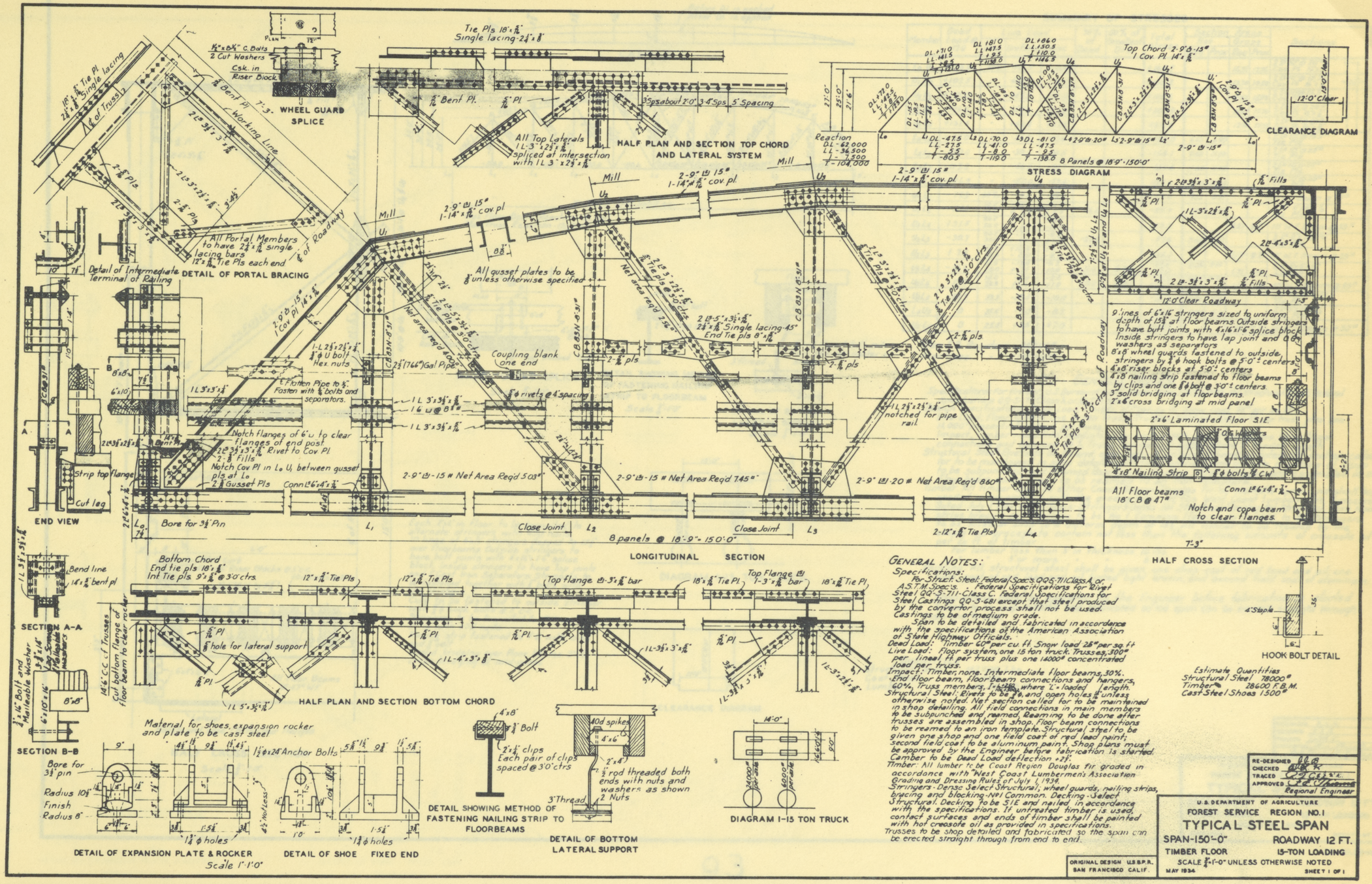
Timber: All lumber to be Coast Region Douglas fir graded in accordance with West Coast Lumbermens Association Grading and Dressing Rules dated July 1, 1934. Stringers-Dense Select Structural, wheel guards, nailing strips, bracing and blocking No 1 Common. Decking-Select Structural. Decking to be SIE and nailed in accordance with the specifications. If untreated timber is used, contact surfaces and ends of timber shall be painted with hot creosote oil as provided in the specifications.

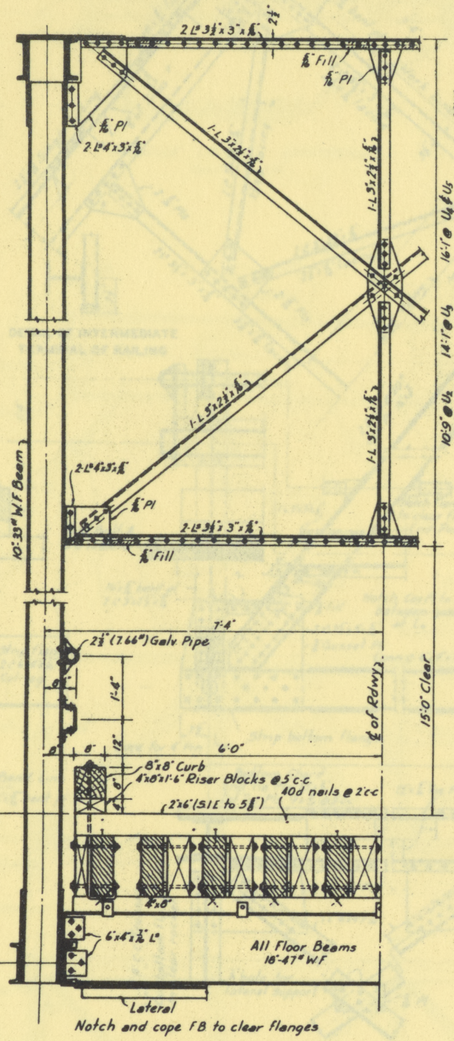
REVISED — 9-28-34
TRACED — P.T.C. & J.N.K.
CHECKED — A.L.K.
APPROVED — Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO 1
TYPICAL STEEL SPAN
SPAN 120'-0⅛" ROADWAY 12 FT.
TIMBER FLOOR 15-TON LOADING
SCALE ¾"=1'-0" UNLESS OTHERWISE NOTED
SEPT. 1934. SHEET 1 OF 1

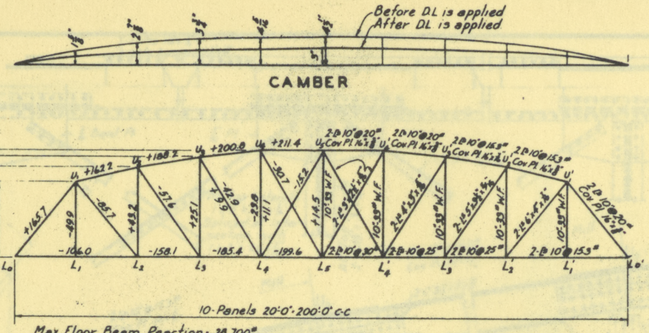
ORIGINAL DESIGN U.S.B.R. SAN FRANCISCO CALIF.

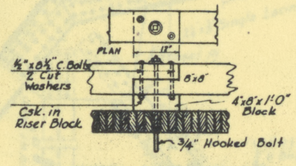
DR. NO. 70


WHEEL GUARD SPLICE
HALF PLAN AND SECTION TOP CHORD AND LATERAL SYSTEM
STRESS DIAGRAM
CLEARANCE DIAGRAM
DETAIL OF PORTAL BRACING
All Portal Members to have 2½"x⅜" single lacing bars 12"x⅜" Tie Pls each end
All gusset plates to be ⅜" unless otherwise specified
Detail of Intermediate Terminal of Railing
END VIEW
SECTION A-A
SECTION B-B
LONGITUDINAL SECTION
HALF PLAN AND SECTION BOTTOM CHORD
HALF CROSS SECTION
HOOK BOLT DETAIL
DETAIL OF EXPANSION PLATE & ROCKER
Scale 1"-1'-0"
DETAIL OF SHOE FIXED END
DETAIL SHOWING METHOD OF FASTENING NAILING STRIP TO FLOORBEAMS
DETAIL OF BOTTOM LATERAL SUPPORT
DIAGRAM 1-15 TON TRUCK
Bore for 3½" Pin
Close Joint
8 panels @ 18'-9" = 150'-0"
12'-0" Clear Roadway
2"x6" Laminated Floor SIE
4"x8" Nailing Strip
All Floor beams 18" CB @ 47#
Notch and cope beam to clear flanges.
Material for shoes, expansion rocker and plate to be cast steel
Bore for 3½" pin
Radius 10½"
Finish
Radius 8"
1½"x24" Anchor Bolts
1¼" ϕ holes
Bottom Chord
End tie pls 18"x⅜"
Int Tie pls 9"x⅜" @ 3'0" ctrs.
Top flange 1-3"x⅜" bar
Top Flange 1-3"x⅜" bar
hole for lateral support
Coupling blank one end
Notch flanges of 6"ω to clear flanges of end post
Notch Cov Pl in Lo U, between gusset pls at Lo
Strip top flange
Cut leg
Bend line
14"x⅜" bent pl
Tie Pls 18"x⅜" Single lacing-2½"x8"
Bent Pl.
All Top Laterals 1L 3"x2½"x⅜" spliced at intersection with 1L 3"x2½"x⅜"
35 psa about 2'0" 3 4"Sps. 5" Spacing
Top Chord 2-9"ω-15# 1 Cov Pl 14"x⅜"
Reaction DL-62 000 LL-36 500 I-7 500 T-104 000
DL +71.0 LL +41.5 I +12.0 T +124.5
DL +181.0 LL +147.5 I +9.3 T +337.8
DL +186.0 LL +130.5 I +11.0 T +327.5
DL -47.5 LL -27.5 I -5.5 T -80.3
DL -70.0 LL -41.0 I -8.0 T -119.0
DL -81.0 LL -47.5 I -9.2 T -138.0
8 Panels @ 18'-9" = 150'-0"
2-9" ω 15# 1-14"x⅜" cov pl
2-9" ω 15# 1-14"x⅜" cov pl
2-9" ω 15# 1-14"x⅜" cov pl
2-9"ω-15 # Net Area Req'd 503"
2-9"ω-15 # Net Area Req'd 745"
2-9" ω-20 # Net Area Req'd 860"
Net area req'd 400"
Net area req'd 2.54"
2 L 3"x3"x⅜" 2½"x⅜" Single lacing-45° End Tie pls 8"x⅜"
2 L 3"x2½"x⅜" Tie pls @ 30" ctrs
2 L 3"x2½"x⅜" Tie Pls @ 30" ctrs
2½" (7.66") Gal Pipe
Fasten with ⅝" bolts and separators.
⅝" rivets @ 4" spacing
1L 3"x3½"x⅜"
16 ω @ 8"
1L 3"x3½"x⅜"
2-⅜" Fills
2-⅜" pls
2-⅜" pls
1L 2½"x2½"x⅜" notched for pipe rail.
2-12"x⅜" Tie Pls
1L 3½"x3"x⅜"
1L 4"x3"x⅜"
1L 5"x3½"x⅜"
4"x8"
⅝" Bolt
2"x¼" clips Each pair of clips spaced @ 3'0" ctrs
40d spikes
4"x6"
2"x4"
⅝" rod threaded both ends with nuts and washers as shown
2 Nuts
3" Thread
14'-0"
16'-6½"
9'-0"
24000# per axle
6000# per axle
9 lines of 6"x16" stringers sized to uniform depth of 15¾" at floor beams. Outside stringers to have butt joints with 4"x16"x1'6" splice block. Inside stringers to have lap joint and ⅛" washers as separators
8"x8" wheel guards fastened to outside stringers by ¾"ϕ hook bolts @ 5'-0" ± centers
4"x8" riser blocks at 5'-0" centers
4"x8" nailing strip fastened to floor beams by clips and one ¾"ϕ bolt @ 3'-0" ± centers.
3" solid bridging at floor beams.
2"x6" cross bridging at mid panel
All Portal Members to have 2½"x⅜" single lacing bars 12"x⅜" Tie Pls each end
Top Chord 2-9"ω-15# 1 Cov Pl 14"x⅜"
Tie Pls 18"x⅜" Single lacing-2½"x8"
Mill
Mill
Mill

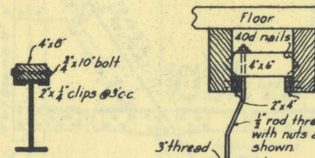


HALF CROSS SECTION
Scale ¾"=1'-0"

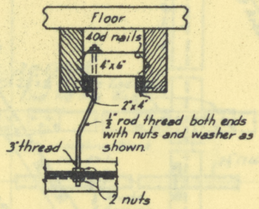




WHEEL GUARD SPLICE
Scale ¾"=1'-0"



DETAIL SHOWING METHOD OF FASTENING NAILING STRIP TO FLOORBEAM
Scale ¾"=1'-0"



DETAIL OF BOTTOM LATERAL SUPPORT.
Scale ¾"=1'-0"

Each 2"x6" in floor to be toenailed to alternate stringers with 40d nails.
10 lines of 6"x⅛" stringers dapped to 15⅝" over floorbeams. Outside stringers to have butt joints with 4"x16"x1'-6" splice block. Inside stringers to have lap joints and 1" Cast Iron Seperators. Stringers to be fastened together with ⅞" bolts with O.G Washers.
Curb to be fastened to outside stringer with ¾" ϕ hook bolts @ 5' c-c.
Stringers to be toenailed to 4"x8" nailing strip with 60d nails.
Nailing strip fastened to F.B with clips and ⅞" bolt.
3 solid bridging over floor beams. 2"x6" cross bridging at mid-panel.

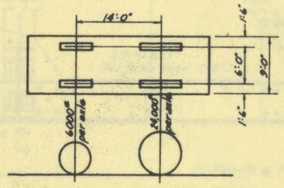
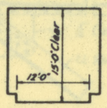


DIAGRAM 1-15 TON TRUCK



CLEARANCE DIAGRAM

SUMMARY OF STRESSES

Member	Dead Load @ 17#	Live Load Imp	Live Load Uniform	Live Load Conc	70% of Dead	50% of Smallest D+L	Total Stress	Section Areas Net Req.	Section Areas Net Prov.	Section Areas Gross Req.	Section Areas Gross Prov.	Sections
L_0U_1	+104.8	18%	+41.5	+19.4			+165.7			16.32	17.76	2 L 10"@20" Cov. Pl. 16"x⅜"
U_1U_2	+102.5	"	+40.7	+19.0			+162.2			13.70	14.92	2 L 10"@15" Cov. Pl. 16"x⅜"
U_2U_3	+119.0	"	+47.2	+22.0			+188.2			15.85	15.91	2 L 10"@15" Cov. Pl. 16"x⅜"
U_3U_4	+126.9	"	+50.3	+23.6			+200.8			16.95	17.76	2 L 10"@20" Cov. Pl. 16"x⅜"
U_4U_5	+131.4	"	+52.2	+27.8			+211.4			17.78	17.76	2 L 10"@20" Cov. Pl. 16"x⅜"
L_0L_1	-67.0	"	-26.6	-12.4			-106.0	6.65	6.99			2 L 10"@15" Tie Pls.
L_1L_2	-100.0	"	-39.6	-18.5			-158.1	9.88	11.99			2 L 10"@25" Tie Pls.
L_2L_3	-117.2	"	-46.5	-21.7			-185.4	11.60	11.99			2 L 10"@22½" Tie Pls.
L_3L_4	-126.2	"	-50.0	-23.4			-199.6	12.46	14.66			2 L 10"@30" Tie Pls.
U_1L_1	-17.9	60%	-9.6	-22.4			-49.9	3.12	8.21			10" W.F. Beam @ 33#
U_1L_2	-51.3	18.5 30.0	-22.8 + 23.3	-11.8 + 5.5	-36.0		-85.7	5.35	5.52			2 L 6"x4"x⅝" Tie Pls.
U_2L_2	+21.5	30.5 30.0	+ 13.7 - 5.6	+8.0 -8.4			+43.2			4.27	9.71	10" W.F. Beam @ 33#
U_2L_3	-30.7	30.5 30.0	-17.0 + 4.9	-9.9 +7.7	-21.5		-57.6	3.60	4.02			2 L 3½"x3½"x⅝" Tie Pls.
U_3L_3	+ 7.4	21.8 28.0	+10.6 - 8.0	+7.1 -9.3			+25.1			2.49	9.71	10" W.F. Beam @ 33#
U_3L_4	-16.6	21.8 28.0	-13.8 + 7.4	-8.3 +10.8	-11.6	± 8.3	-49.3 + 9.9	2.68	2.91	1.71	6.18	2 L 4"x3"x⅜" Laced
U_4L_4	-12.7	18.0 23.3	-7.0 18.5	-3.8 +7.8	-8.9	± 3.7	-33.8 +11.1	2.48	8.21	1.10	9.71	10" W.F. Beam @ 33#
U_4L_5	-10.3	23.3	-10.4	-10.0			-30.7	1.92	2.16			2 L 3"x2½"x⅜" Tie Pls.
L_4U_5	0	25.4	-7.0	-8.2			-15.2	0.95	2.16			2 L 3"x2½"x⅜" Tie Pls.
U_5L_5	0	25.4	+7.5	+7.0			+14.5			1.44	9.71	10" W.F. Beam @ 33#

Max. F.B. Reaction = 28,700#
Max. Truss = 131,300#

GENERAL NOTES

Specifications: For timber, U.S. Bureau of Public Roads. Form F.B. 50, 1932. For Structural Steel; Federal Specifications QQ-S-711 Class A, or A.S.T.M. Specs.
Design Specifications. Dead Load, Timber 60# per cu. ft. Snow Load 25# per sq. ft.
Live Load; Floor system, one 15 ton truck, Trusses. 300# per lineal ft. per truss plus one 14,000# concentrated load per truss.
Impact, Timber none. Intermediate floor beams 30%. End floor beams, floor beam connections and hangers 60%. Truss members, $I = \frac{L}{L+125}$ where 'L' = loaded length.
Structural Steel Rivets to be ¾ϕ and open holes ⅞" unless otherwise noted. Net section called for to be maintained in shop detailing. All field connections in main members of truss to be subpunched and reamed. Reaming to be done after trusses are assembled in shop. Floor beam connections to be reamed to an iron template.
Timber: All timber shall be either Coast Region Douglas Fir or Western Larch and shall be graded in accordance with the grading rules of the West Coast Lumberman's Association dated July 1, 1934 as follows: Stringers-Dense Sel. Structural. Flooring-Sel. Structural. Curb nailing strips, bracing and blocking to be No. 1 Common. Flooring to be 5.1 E. to 5⅛". Stringers to be sized at ends to a uniform depth of 15⅝". All timber to be treated by the empty cell process, to contain not less than the following amounts of creosote oil per cu. ft. of timber.
For lumber less than 5" in thickness, 10 lbs.
" " 5" or more " " 8 " "
Painting: All structural steel shall be given one shop coat of red lead and oil; one field coat of red lead and oil, tinted light brown; and second field coat of aluminum.

Shop plans must be approved by the Engineer before fabrication is started.
Trusses to be shop detailed and fabricated so the span can be erected straight through from end to end.

QUANTITIES
Structural Steel 147,000 Lbs.
Cast Steel 1,400 "
Lumber 38.43 M B M.

DESIGNED A.L.K.
CHECKED
TRACED
APPROVED
Asst. Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
TYPICAL STEEL SPAN
SPAN-200'-0" ROADWAY 12 FT.
TIMBER FLOOR 15-TON LOADING
SCALE AS SHOWN
JUNE 1934 SHEET 1 OF 2

DR. NO. 28-A

DETAIL OF INTERMEDIATE TERMINAL OF RAILING

SECTION A-A

DETAIL OF EXPANSION PLATE & ROCKER
Scale 1"-1'0"

DETAIL OF SHOE FIXED END
Scale 1"-1'0"

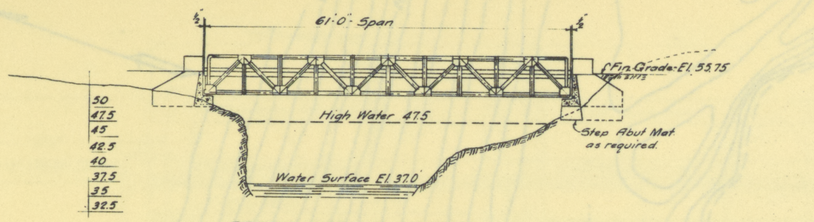
DESIGNED	A.L.K.
CHECKED	J.H.B.
TRACED	G.H.C.
APPROVED	[illegible]
	Acting Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1

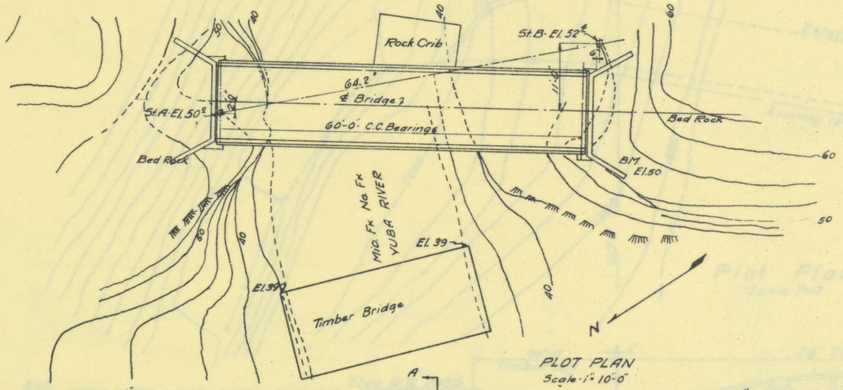
TYPICAL STEEL SPAN

SPAN-200'-0" ROADWAY 12 FT.
TIMBER FLOOR 15-TON LOADING
SCALE 1/4"-1'-0" UNLESS OTHERWISE NOTED
JUNE 1934 SHEET 2 OF 2

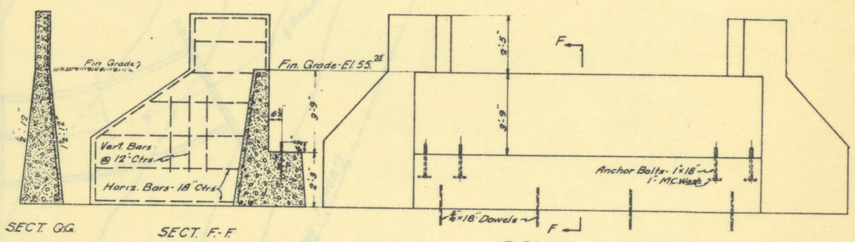
DR. NO. 39-B.



PROFILE LOOKING UPSTREAM
Scale 1"=10'-0"

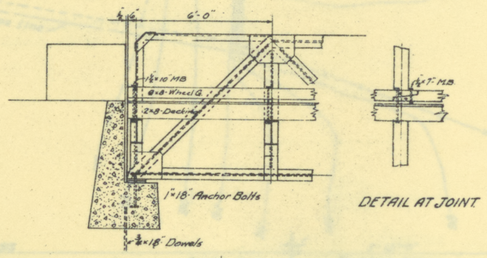


PLOT PLAN
Scale 1"=10'-0"



SECT. G-G. SECT. F-F.

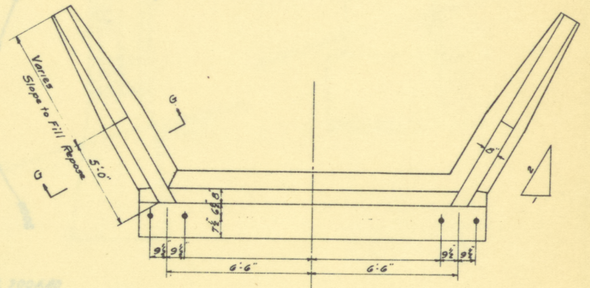
ELEVATION OF ABUTMENT
Scale 1"=1'-0"



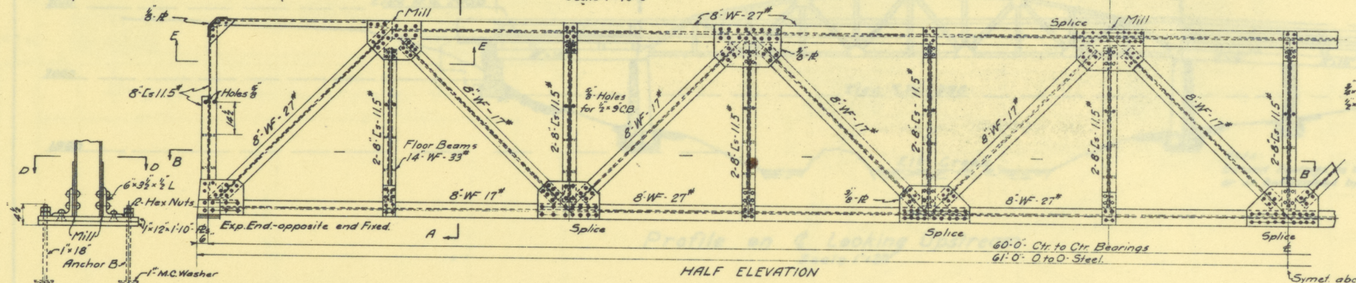
SECT. E-E.

DETAIL AT JOINT

Note:
Extend footings down to solid material.
All reinforcing bars square.

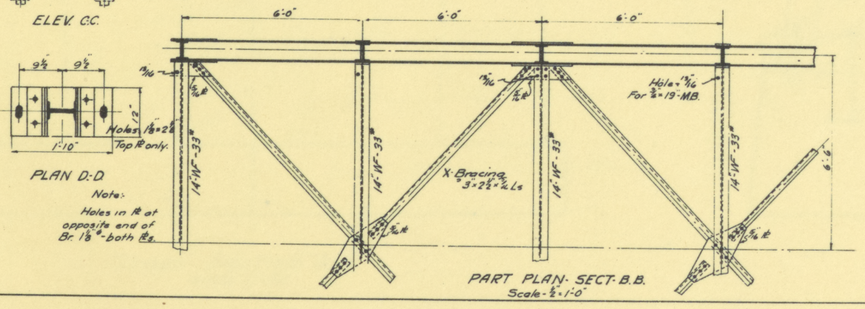


PLAN OF ABUTMENT
Scale ⅜"=1'-0"



HALF ELEVATION

ELEV. C-C.

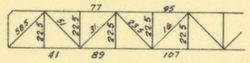


PART PLAN-SECT. B-B.
Scale ½"=1'-0"

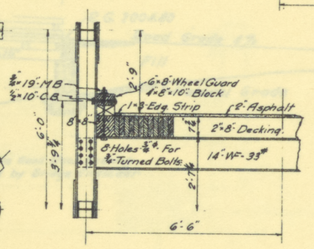
PLAN D-D

Note:
Holes in Pl. at opposite end of Br. 1⅛"ø both Pls.

All Rivets ¾"ø
All Bolts ¾"ø unless noted otherwise.
All Gusset Pls-⅜" unless noted otherwise
Increase length of Top Chord ⅛" per 10'-0" for Camber.



STRESS DIAGRAM
Stresses in Kips



HALF SECT. A-A
Scale ½"=1'-0"

BOLTS REQUIRED	
44	⅝"x10" Carriage Bolts
22	⅞"x9" Machine Bolts
6	½"x7" " "
	Washers Req.
44	¾"ø M.C.T.
12	½" "
44	1" Cut Washers
8	1" Mall. Cast Washers
	Anchor Bolts
8	1"ø 18" 2 Hex Nuts Ea.

Note:
Quantity of all washers to be increased by 10% of above list.
All bolts shall have 3" Thread.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER REGIONAL ENGINEER

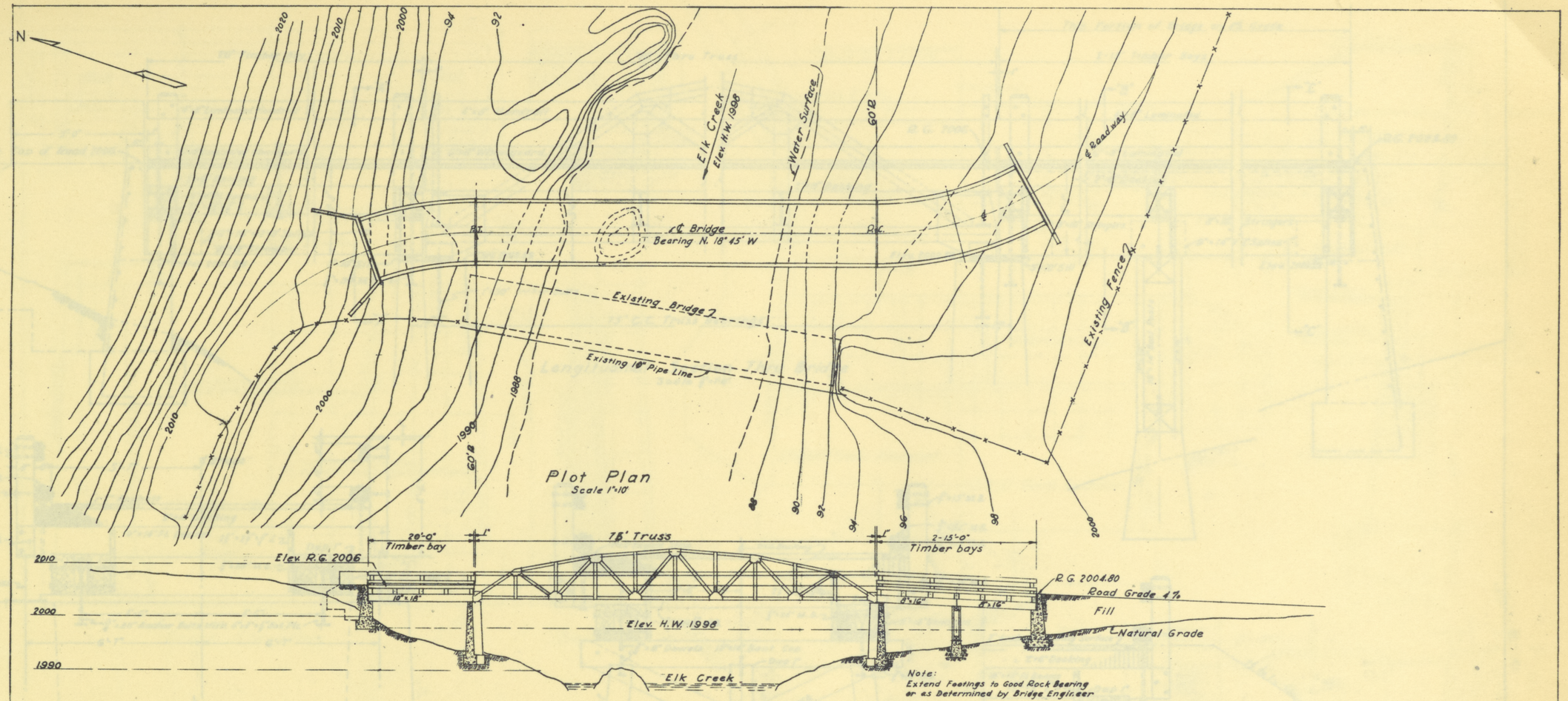
MID. FK. OF NO. FK. YUBA RIVER BRIDGE
2ND DIVIDE BRIDGE

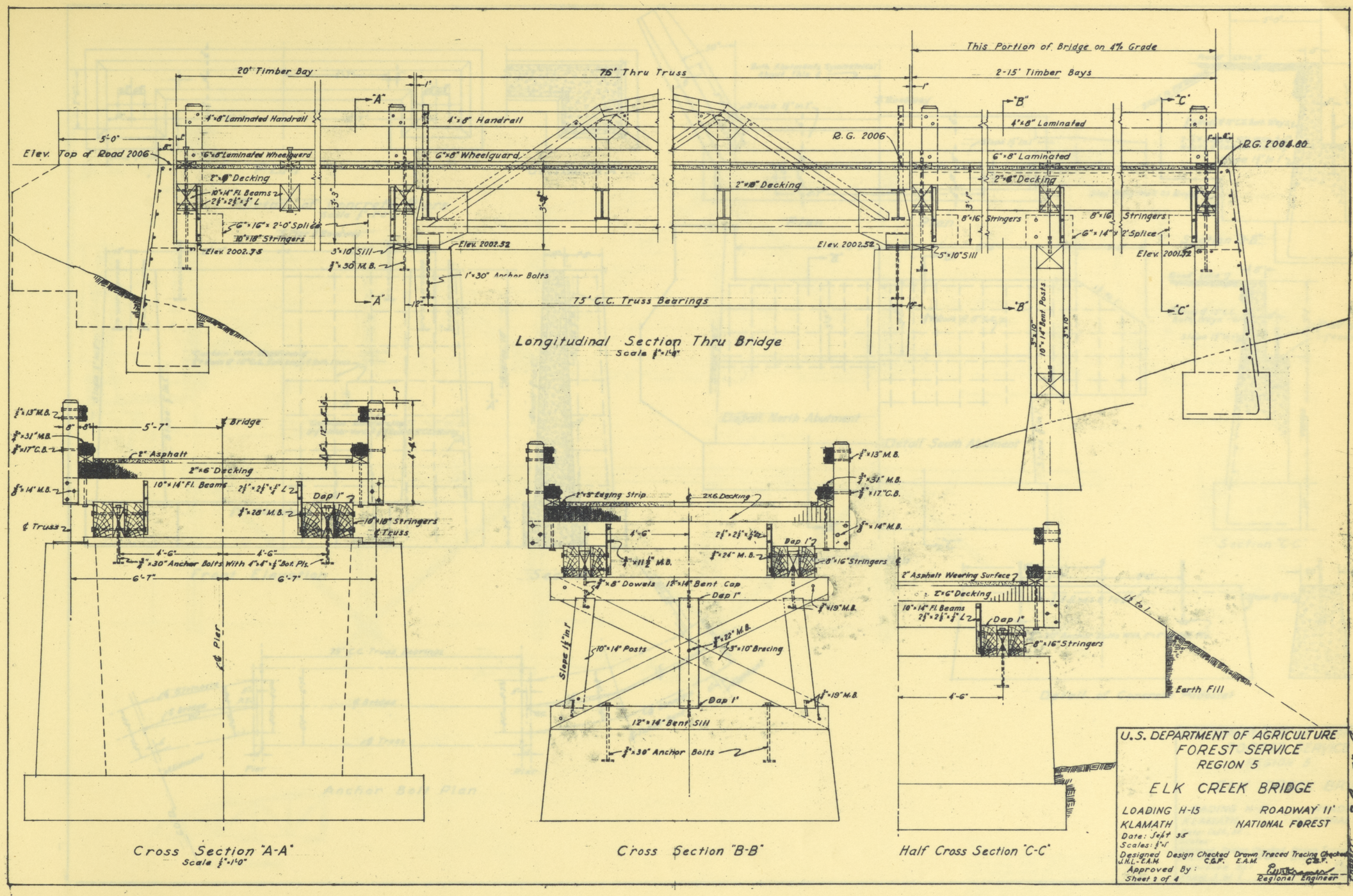
LOADING-H-15 ROADWAY-12'-0"
TAHOE NATIONAL FOREST

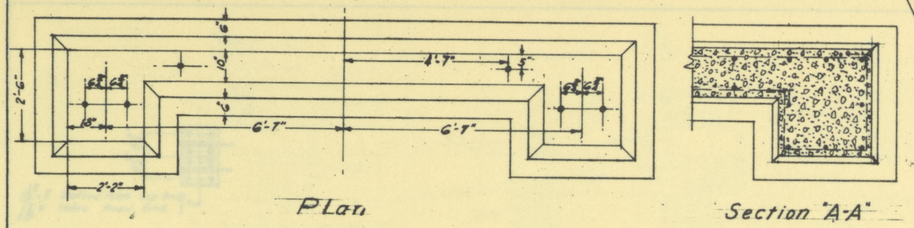
DESIGNED J.H.L.-N.K.M. DRAWN N.K.M. TRACED J.H.K.
SCALE- as shown CHECKED N.K.M.
APPROVED DATE

E.W. Kramer
REGIONAL ENGINEER

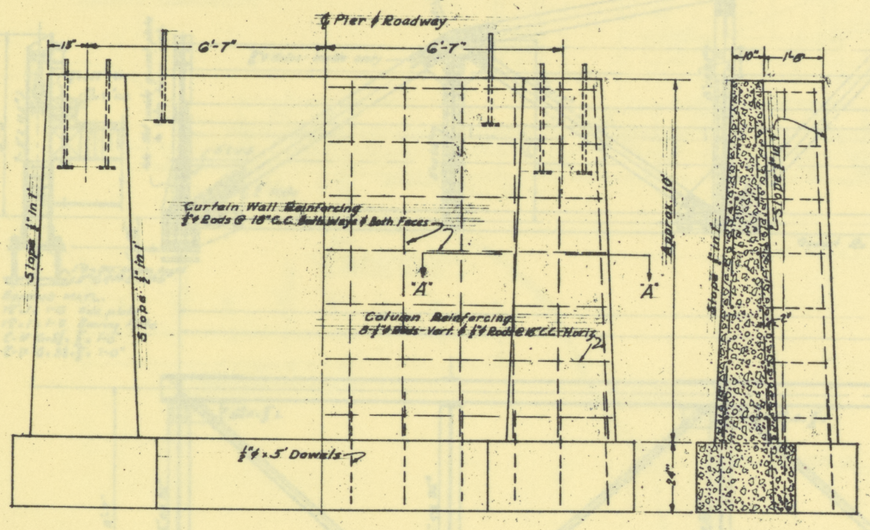
CORRECT-Chas. H. Lawrence
CIVIL ENGINEER

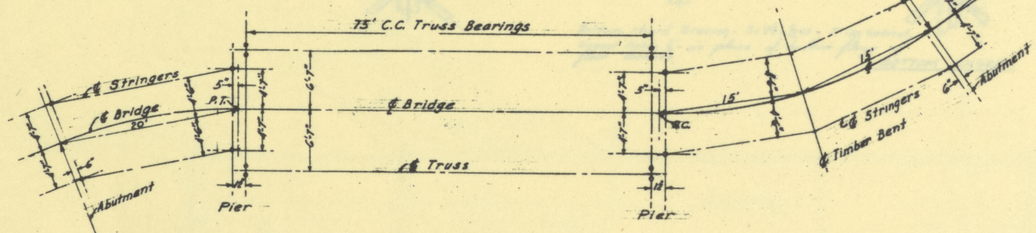

N
2020
2010
2000
94
92
Elk Creek
Elev H.W. 1998
Water Surface
60'±
Roadway
℄ Bridge
Bearing N. 18° 45' W
P.I.
P.C.
Existing Bridge
Existing 10" Pipe Line
Existing Fence
1998
1990
Plot Plan
Scale 1"=10'
88
90
92
94
96
98
2000
20'-0" Timber bay
1'
75' Truss
1'
2-15'-0" Timber bays
Elev. R.G. 2006
2010
2000
1990
18"x18"
8"x16"
8"x16"
R.G. 2004.80
Road Grade 4%
Fill
Natural Grade
Elev. H.W. 1998
Elk Creek
Note:
Extend Footings to Good Rock Bearing
or as Determined by Bridge Engineer
Profile on ℄ Looking Upstream
Scale 1"=20'
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
ELK CREEK BRIDGE
LOADING H-15
ROADWAY 11'
KLAMATH
NATIONAL FOREST
Date: Sept. 35
Scales: 1"=10'
Designed J.H.L. Design Checked E.A.M. Drawn C&F Traced E.A.M. Tracing Checked C&F
Approved By: E.W.K.
Regional Engineer
Sheet 1 of 1
Correct: John H. Lawrence
Bridge Engineer

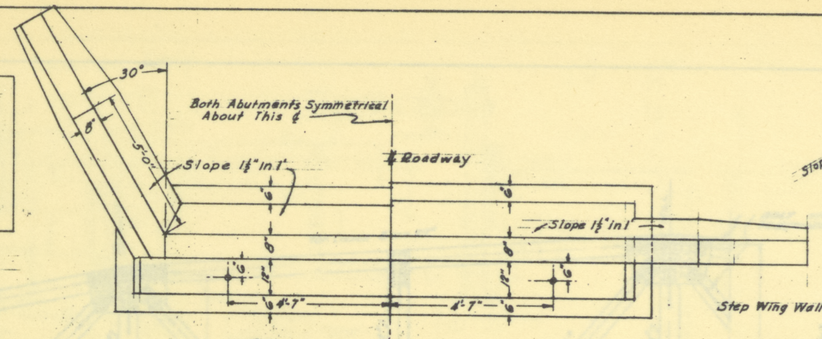

20' Timber Bay
76' Thru Truss
This Portion of Bridge on 4% Grade
2-15' Timber Bays
"A"
"B"
"C"
4"x8" Laminated Handrail
4"x8" Handrail
4"x8" Laminated
5'-0"
Elev. Top of Road 2006
6"x8" Laminated Wheelguard
6"x8" Wheelguard
R.G. 2006
R.G. 2006.80
2"x6" Decking
10"x14" Fl. Beams
2½"x2½"x½" L
6"x16"x 2'-0" Splice
10"x18" Stringers
3'-3"
3'-1"
8"x16" Stringers
6"x14" 2' Splice
Elev. 2002.78
Elev. 2002.52
Elev. 2001.52
3"x10" Sill
¾"x30" M.B.
1"x30" Anchor Bolts
12"
75' C.C. Truss Bearings
5"x10" Sill
3"x10"
10"x14" Bent Posts
Longitudinal Section Thru Bridge
Scale 1"=10'
¾"x13" M.B.
¾"x31" M.B.
¾"x17" C.B.
8"
5'-7"
Bridge
2" Asphalt
2"x6" Decking
¾"x14" M.B.
10"x14" Fl. Beams
2½"x2½"x½" L
Dap 1"
¾"x28" M.B.
10"x18" Stringers
℄ Truss
4'-6"
¾"x30" Anchor Bolts With 4"x6"x½" Bot. Plts.
6'-7"
℄ Pier
Cross Section "A-A"
Scale ¼"=1'0"
1"x8" Edging Strip
2x6 Decking
1'-6"
2½"x2½"x½" L
¾"x11½" M.B.
¾"x24" M.B.
8"x16" Stringers
¾"x8" Dowels
12"x14" Bent Cap
¾"x19" M.B.
Slope 1½" in 1'
10"x14" Posts
¾"x22" M.B.
3"x10" Bracing
12"x14" Bent Sill
¾"x36" Anchor Bolts
Cross Section "B-B"
2" Asphalt Wearing Surface
2"x6" Decking
10"x14" Fl. Beams
2½"x2½"x½" L
1½ to 1
Earth Fill
4'-6"
Half Cross Section "C-C"
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
ELK CREEK BRIDGE
LOADING H-15
ROADWAY 11'
KLAMATH
NATIONAL FOREST
Date: Sept 35
Scales: ½"=1'
Designed J.H.L. Design Checked E.A.M. Drawn C.G.F. Traced Tracing Checked E.A.M. C.G.F.
Approved By:
Regional Engineer
Sheet 2 of 4

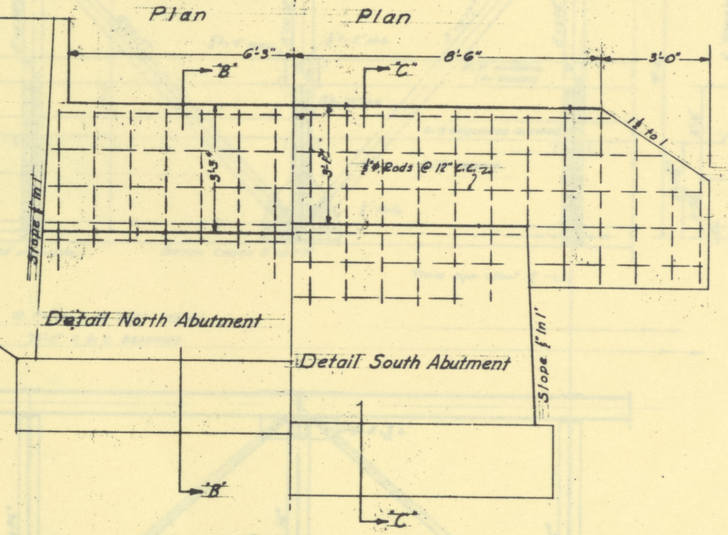


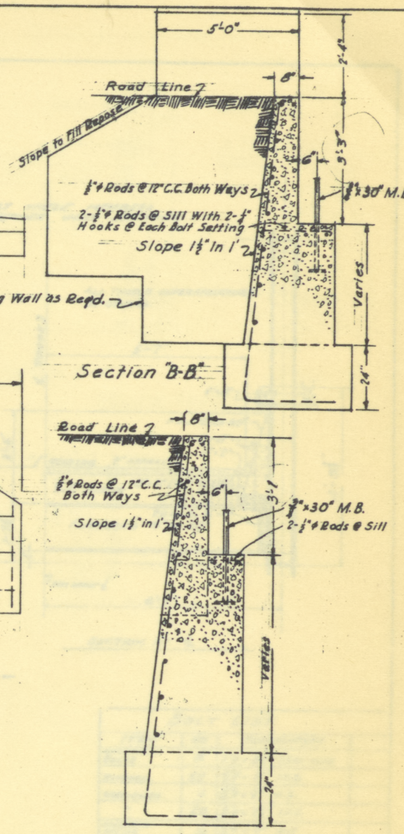
Detail of Concrete Piers
Scale ½"=1'-0"

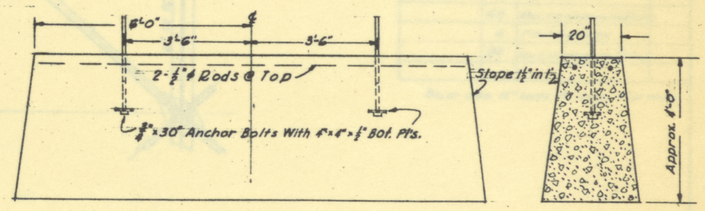












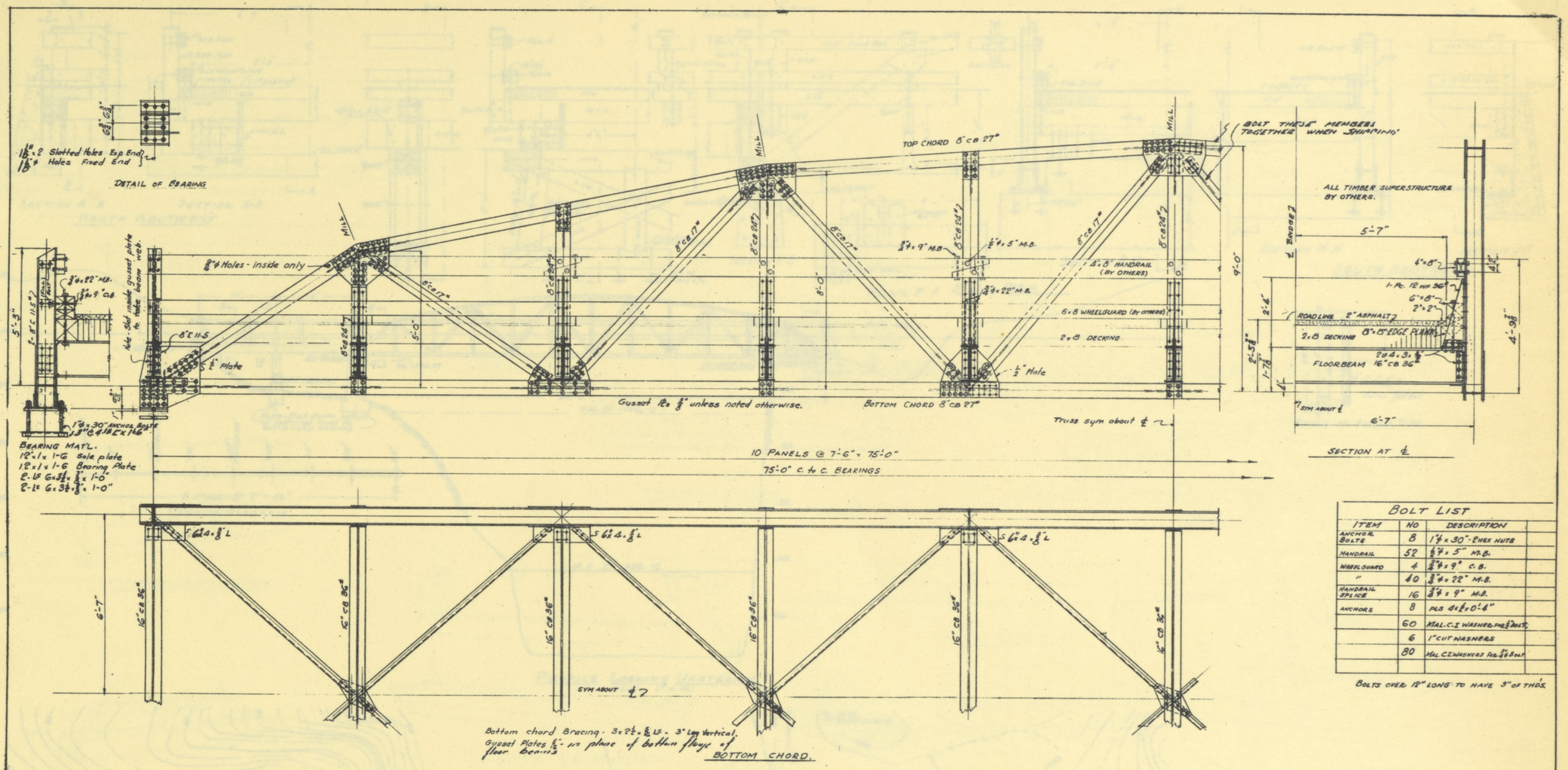
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

ELK CREEK BRIDGE

LOADING H-15 ROADWAY 11'
KLAMATH NATIONAL FOREST
Date: Sept., 35.
Scales:
Designed J.M.L.-E.A.M. Design Checked C.G.F. Drawn E.A.M. Traced Tracing Chkd. C.G.F.
Approved By:
Sheet 3 of 4

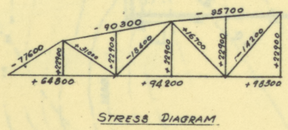
E. W. Kramer
Regional Engineer

Correct John H. Lawrence
Bridge Engineer.



BOLT LIST			
ITEM	NO	DESCRIPTION	
ANCHOR BOLTS	8	1⅞" x 30" - 2 HEX NUTS	
HANDRAIL	52	⅞" ø x 5" M.B.	
WHEELGUARD	4	⅞" ø x 9" C.B.	
"	40	⅞" ø x 22" M.B.	
HANDRAIL SPLICE	16	⅞" ø x 9" M.B.	
ANCHORS	8	PLS 4½" x 0'-6"	
	60	MAL. C.I WASHERS FOR ⅞" BOLTS	
	6	1" CUT WASHERS	
	80	MAL. C.I WASHERS FOR ⅝" ø BOLTS	

BOLTS OVER 12" LONG TO HAVE 3" OF THDS.



STRESS DIAGRAM

Holes
Rivets ⅞" ø
Field Connections to be bolted with ⅞" ø rolled body bolts. Field connection holes to be sub-punched 1/16" ø and reamed to snug fit for ⅞" ø rolled body bolts, with members in place.
Shop plans shall be submitted for approval before fabrication is started.
Increase length of top chord ½" per 7'-6" panel for camber.
Shop assemble & Match mark all field connections

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

STANDARD 75' TRUSS

LOADING H-15 ROADWAY 12
NATIONAL FOREST.

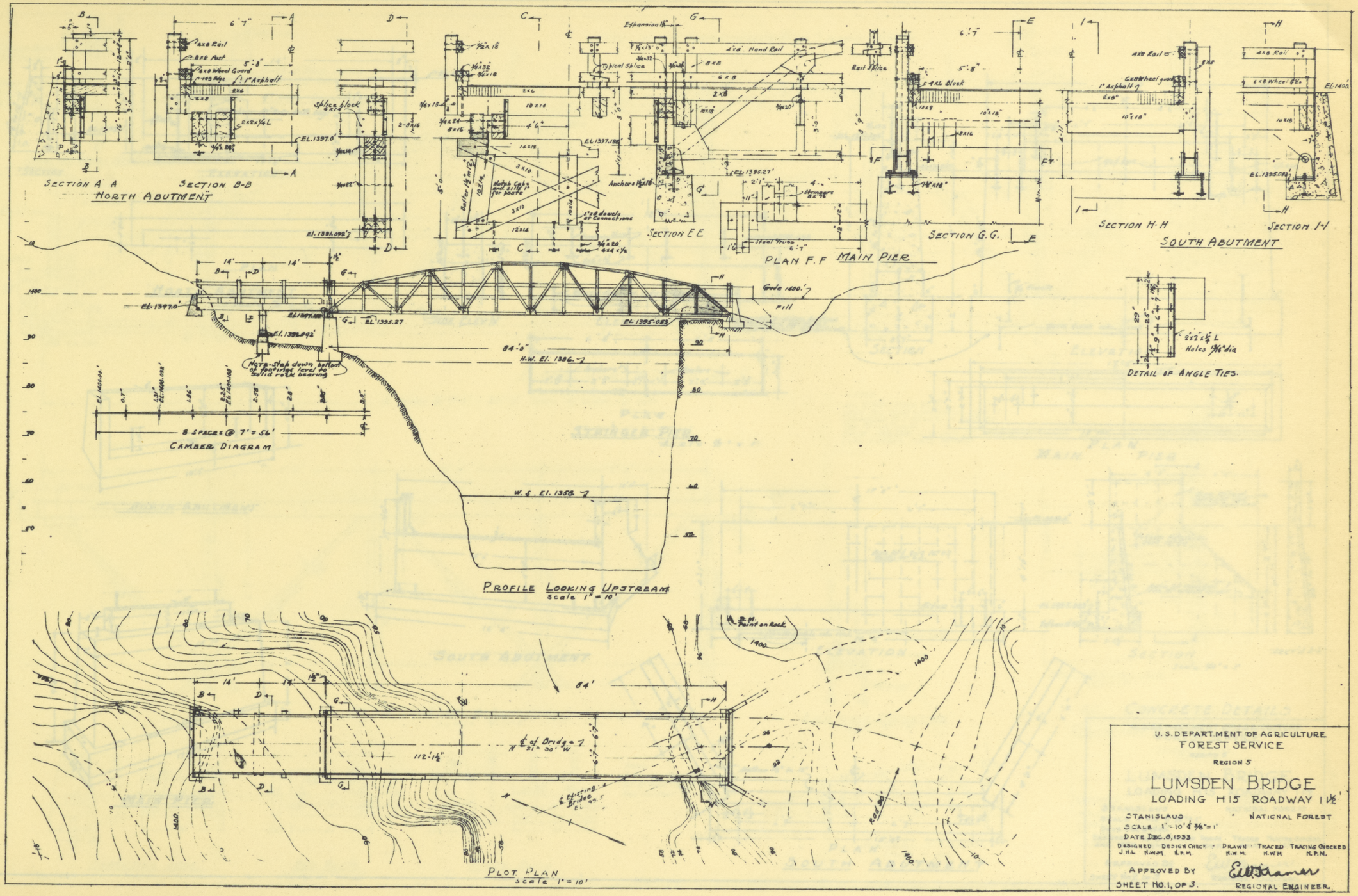
DATE: JAN. 31, 1935.
SCALE: ½" = 1'-0

DESIGNED	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED
JHL	RHL	E.A.M.	RHL	E.A.M.

APPROVED BY: E.W. Kramer
REGIONAL ENGINEER

SHEET 4 OF 4

BRIDGE ENGINEER Glen H. Lawrence



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

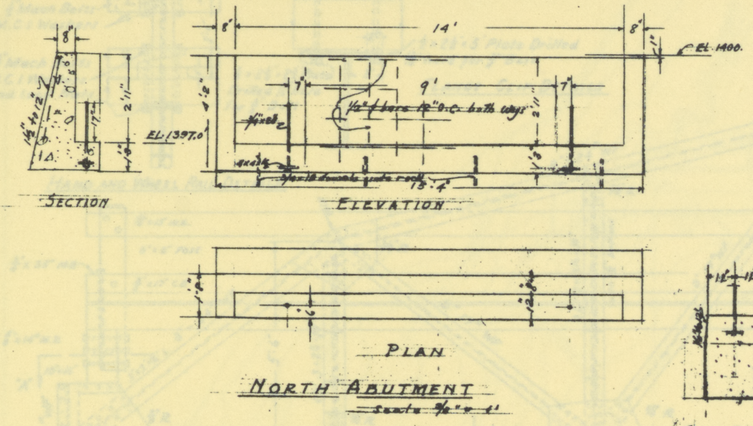
LUMSDEN BRIDGE
LOADING H15 ROADWAY 1½'

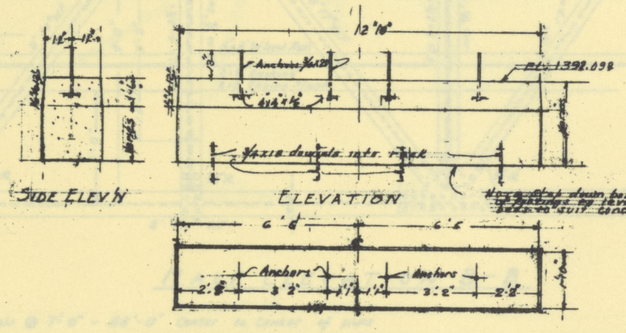
STANISLAUS NATIONAL FOREST
SCALE 1" = 10' & 3/8" = 1'
DATE DEC. 8, 1933

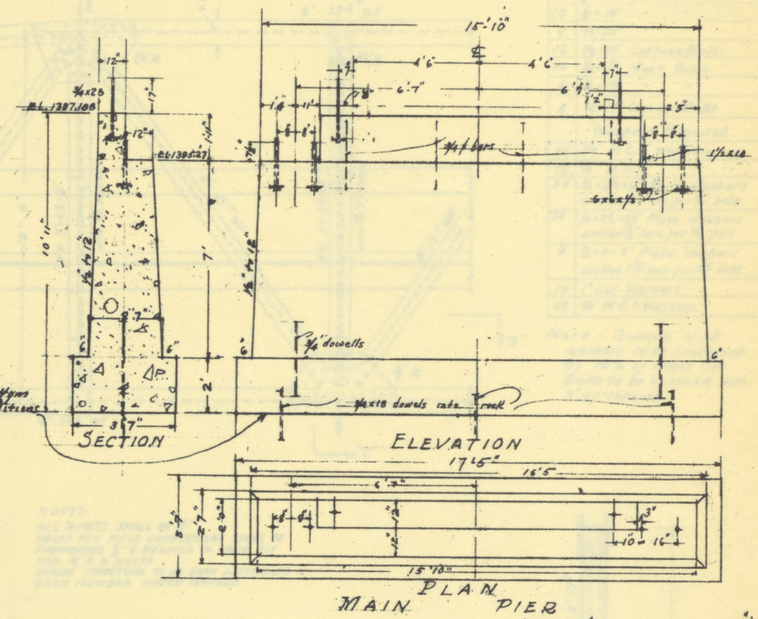
DESIGNED	DESIGN CHECK	DRAWN	TRACED	TRACING CHECKED
J.H.L.	N.M.M.	E.P.M.	N.W.M.	N.W.H.	N.P.M.

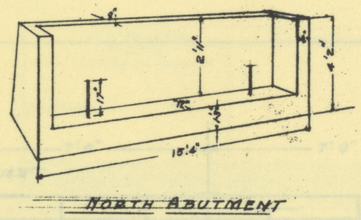
APPROVED BY E. W. Kramer
REGIONAL ENGINEER.

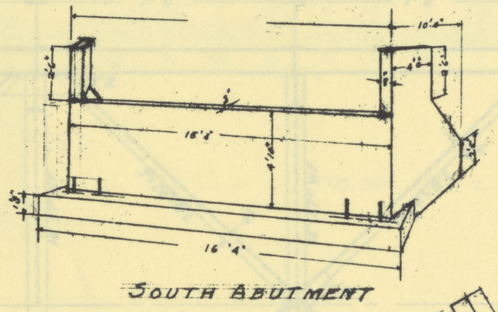
SHEET NO. 1, OF 3.

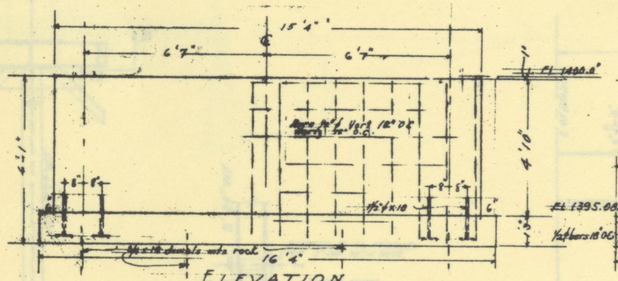


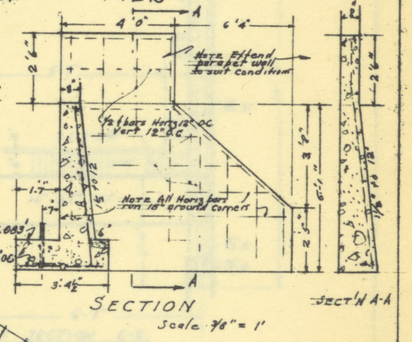


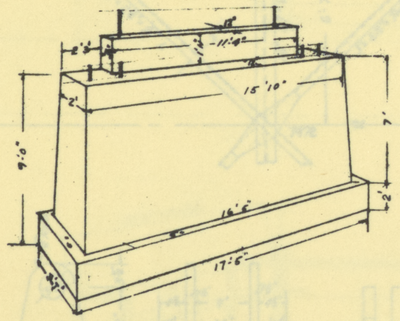


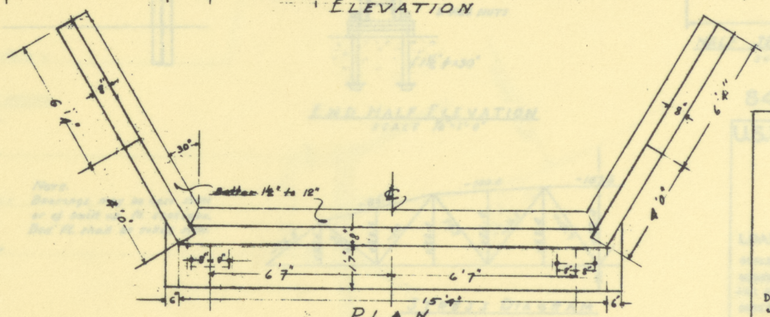












CONCRETE DETAILS

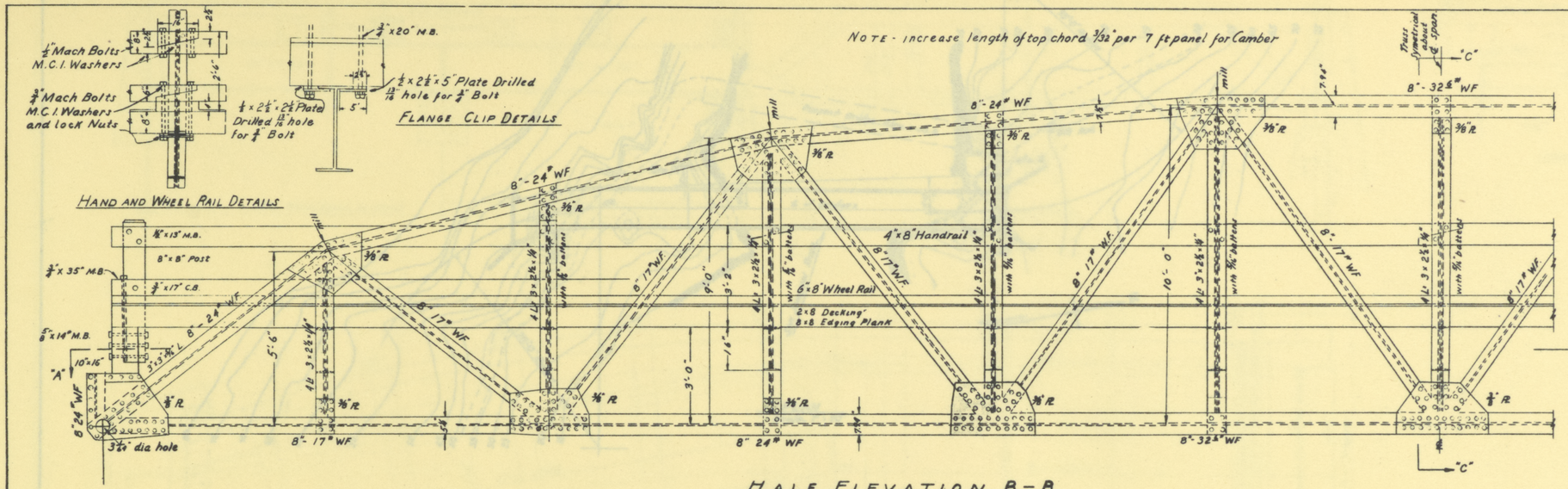
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

LUMSDEN BRIDGE
LOADING H15 ROADWAY 11½'

STANISLAUS NATIONAL FOREST
SCALE 1"=10' & ⅜"=1'
DATE DEC 6 1933.

DESIGNED	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED
J.M.L. N.W.M.	N.P.M.	N.W.M.	N.W.M.	N.P.M.

APPROVED BY E.W. Kramer
SHEET No 2. OF 3 REGIONAL ENGINEER



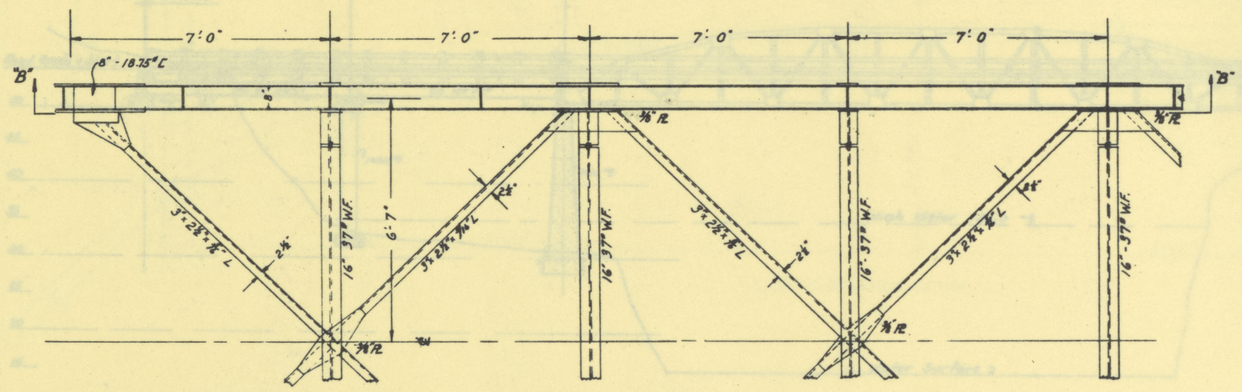
HALF ELEVATION B-B

12 Panels @ 7'-0" = 84'-0" Center to Center of pins

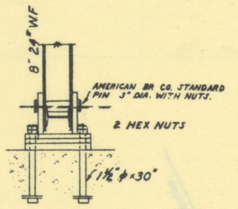
	BOLTS REQUIRED
8	1½ x 30" Mach Bolts Lock Nuts
44	¾ x 20" Mach Bolts Lock Nuts
12	⅝ x 9" Mach Bolts
12	⅝ x 14" " "
4	¾ x 35" " "
12	⅝ x 10" Carrage Bolts
56	½ x 5" Mach Bolts
8	½ x 13" " "
4	¾ x 17" Carrage Bolts
	Washers Required
44	¾" M.C.I. Washers
72	½" M.C.I. "
44	½ x 2½ x 5" Plate Washers drilled 1⅛" hole for ¾" bolt
44	½ x 2½ x 2½" Plate Washers drilled 13/16" hole for ¾" bolt
8	½ x 4 x 4" Plate Washers drilled 1⅛" hole for 1⅛" bolt
16	1" Cut Washers
24	⅝" M.C.I Washers

Note - Quanity of all washers to be increased by 10% of above list. Bolts to be supplied with 3" of thread.

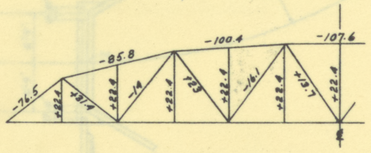
NOTES:
ALL RIVETS SHALL BE ¾"
HOLES FOR FIELD CONNECTIONS SHALL BE SUB-PUNCHED ¼" & REAMED TO SNUG FIT FOR ¾" R.B. BOLTS.
ENTIRE STRUCTURE TO BE SHOP ASSEMBLED & EACH MEMBER MATCH MARKED.



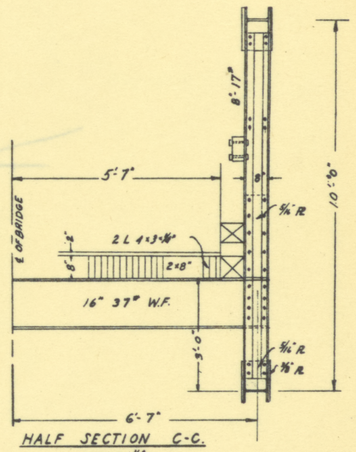
PLAN SECTION A-A
Scale ½"=1'-0"



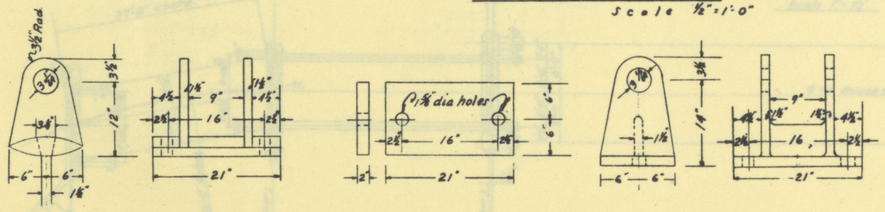
END HALF ELEVATION
SCALE ½"=1'-0"



STRESS DIAGRAM
STRESS IN KIPS.



HALF SECTION C-C.
SCALE ½"



EXPANSION SHOE.

BED PLATE
SCALE 1"=1'-0"

FIXED SHOE

Note.
Bearings may be cast steel or of built up Pl. sections. Bed Pl. shall be rolled steel.

84 FOOT TRUSS BRIDGE

U.S. DEPARTMENT AGRICULTURE
FOREST SEVICE
REGION 5

LOADING — ROADWAY
SCALE — DATE

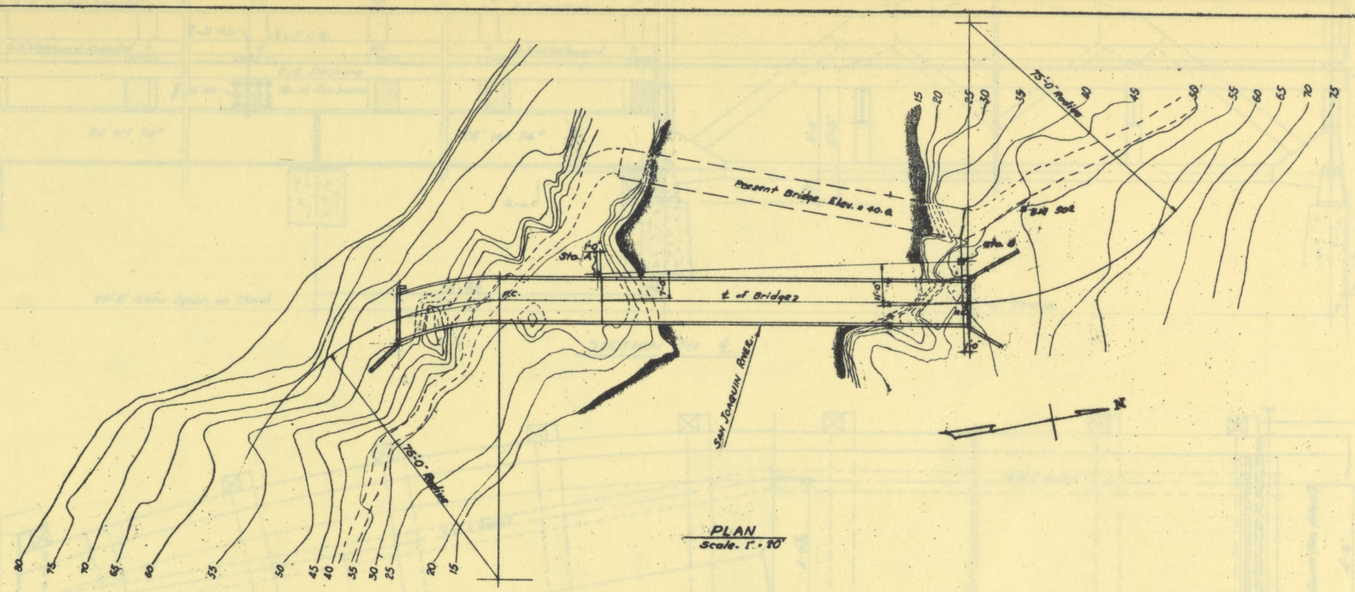
DESIGNED	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED
J.H.L	N.F.M.	N.F.M.	W.W.M.	N.W.M.	N.F.M.

SHEET NO. — OF

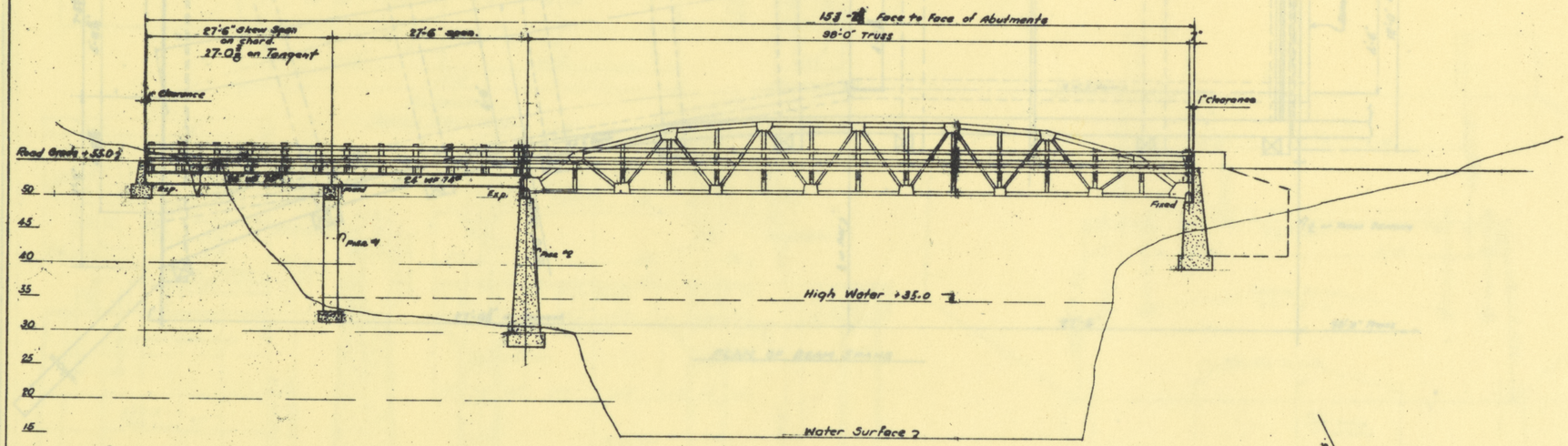
APPROVED BY
E. W. Kramer
REGIONAL ENGINEER

CORRECT
Edgar H. Lawrence
BRIDGE ENGINEER

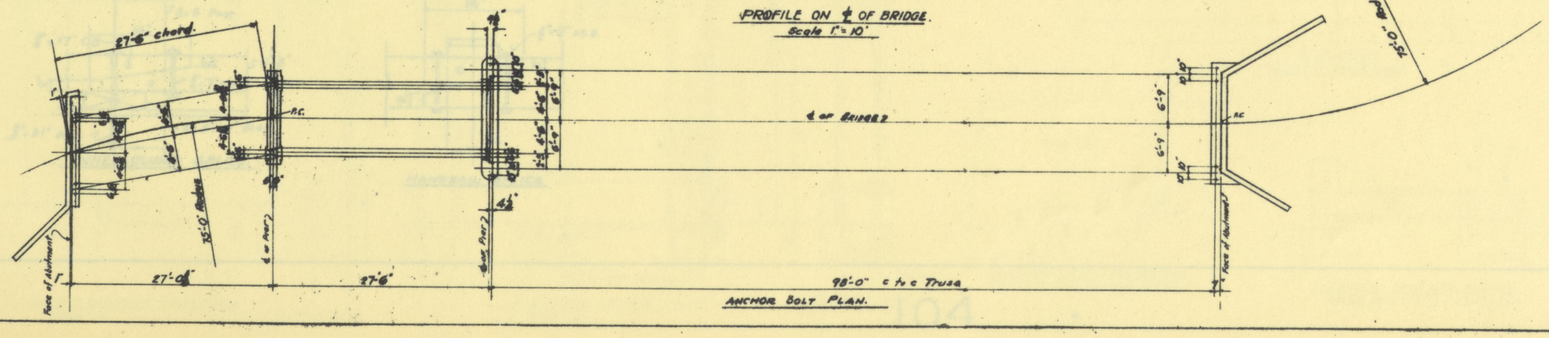
LIST OF DWGS	
Sheet No.	Description
1	Plan & Profile
2	Superstructure details
3	Concrete details
4	Steel Beam spans
5	Std. 98' steel Thru Truss



PLAN
Scale 1" = 10'



PROFILE ON ℄ OF BRIDGE.
Scale 1" = 10'



ANCHOR BOLT PLAN.

U. S. DEPARTMENT OF AGRICULTURE.
FOREST SERVICE
REGION 5.

ITALIAN BAR BRIDGE · SAN JOAQUIN RIVER
LOADING H15 ROADWAY 12'-0"
SIERRA NATIONAL FOREST.

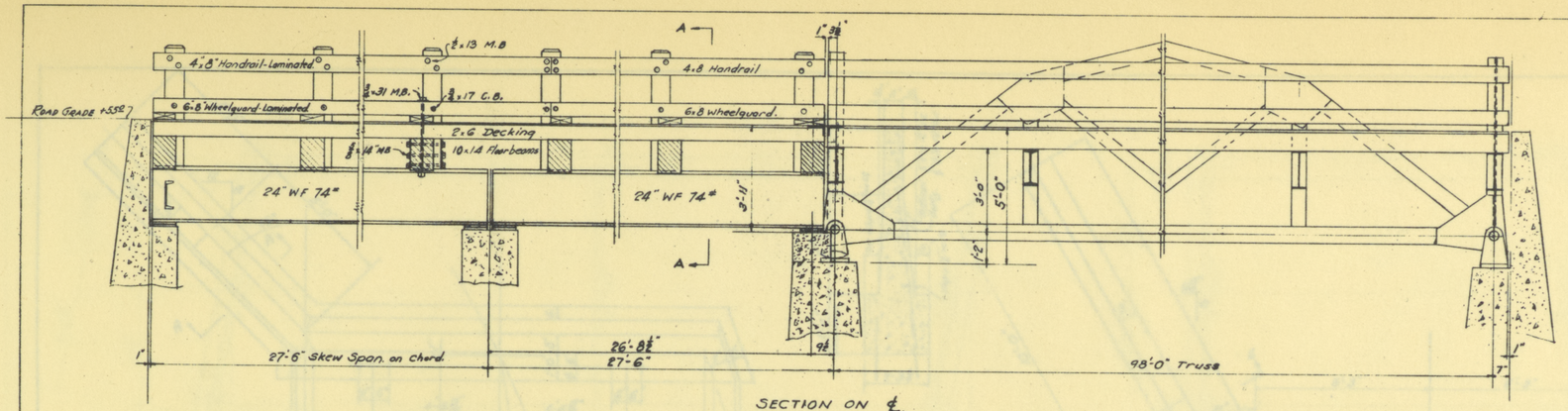
DATE. - JAN 15, 1935.
SCALES.

DESIGNED	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED.
F.H.L - R.H.L.	J.W.N	R.H.L	R.H.L.	

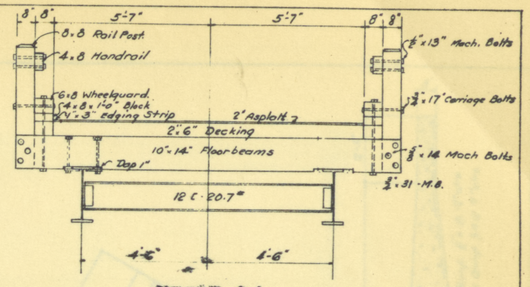
APPROVED BY.
SHEET 1 of 5

T. W. Kramer
REGIONAL ENGINEER.

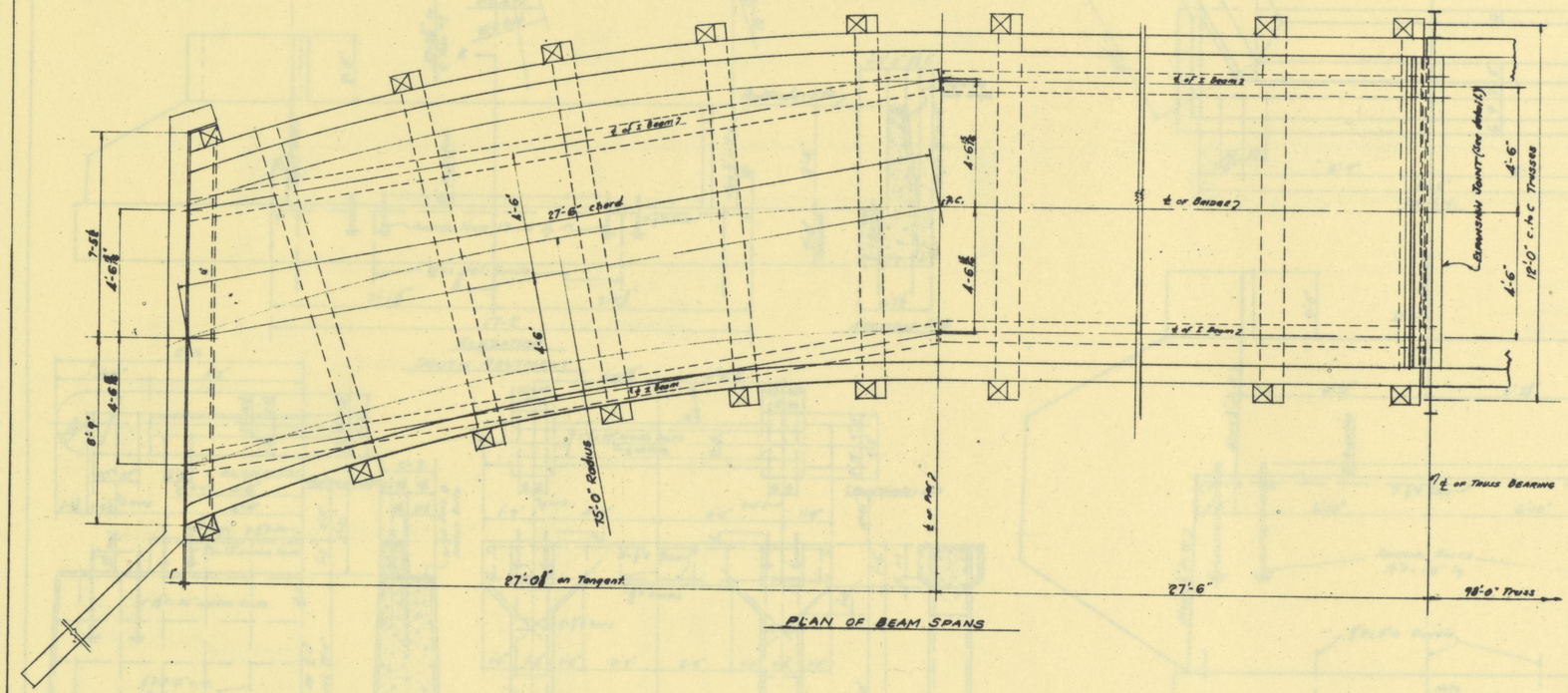
CONSULTING BRIDGE ENGINEER.



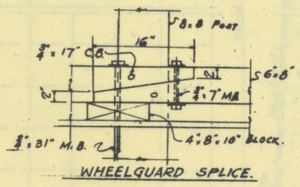
SECTION ON ℄



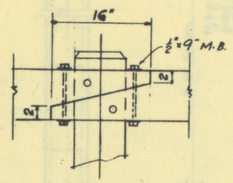
SECTION A-A.



PLAN OF BEAM SPANS



WHEELGUARD SPLICE.



HANDRAIL SPLICE

U. S. DEPARTMENT OF AGRICULTURE.
FOREST SERVICE.
REGION 5.

ITALIAN BAR BRIDGE. - San Joaquin River.

LOADING - H 15 — ROADWAY, 12'-0"
SIERRA — NATIONAL FOREST.

DATE - JAN. 15, 1935
SCALES.

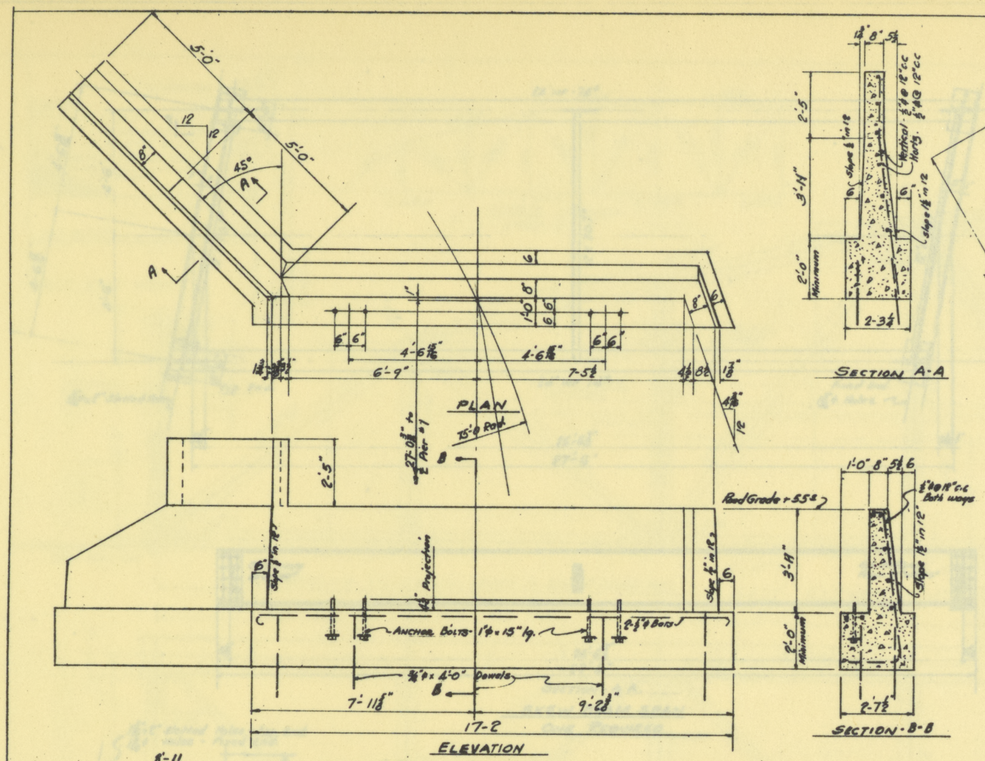
DESIGNED.	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED
J.H.L.-R.H.L.	J.W.N.	R.H.L.		R.H.L.

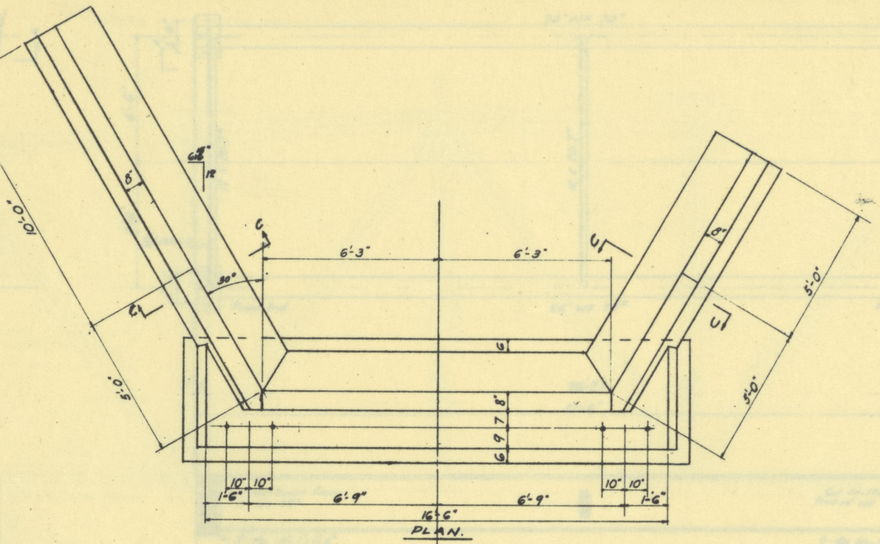
APPROVED BY

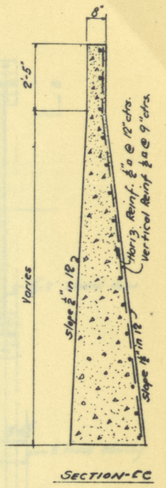
SHEET 2 OF 5

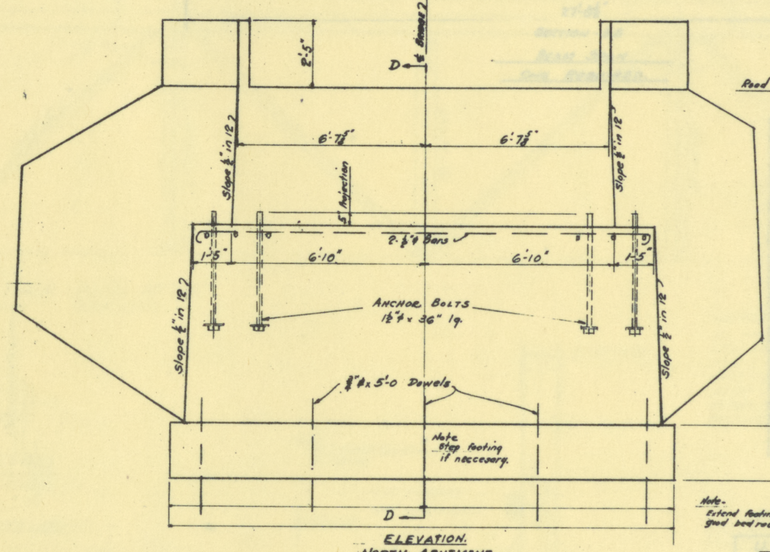
REGIONAL ENGINEER.

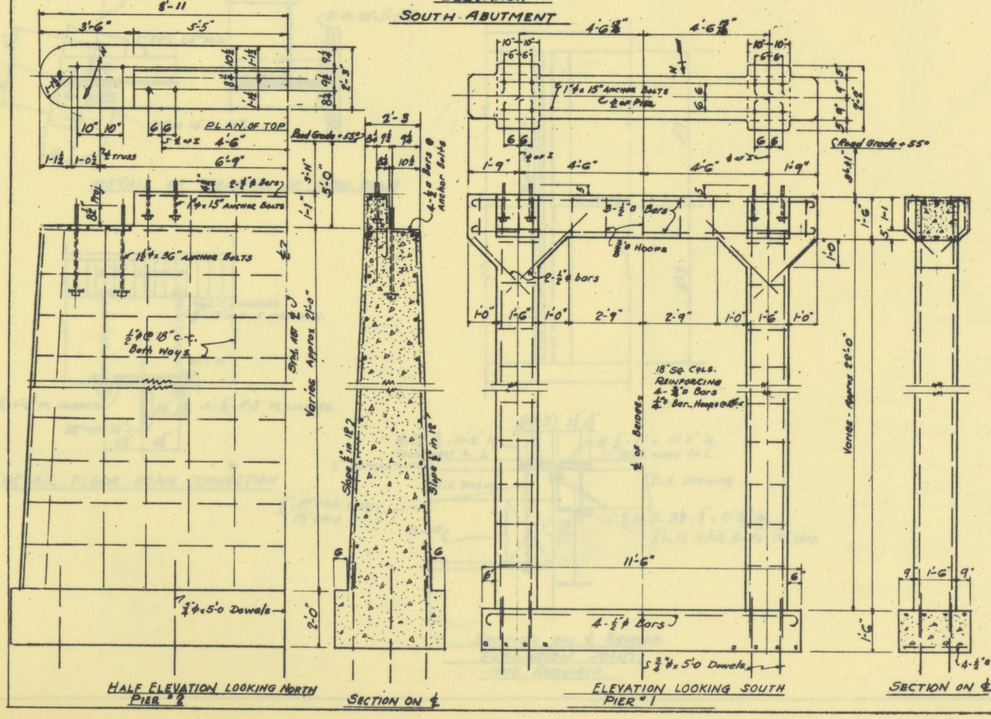
CORRECT: John E. Lawrence
BRIDGE ENGINEER.

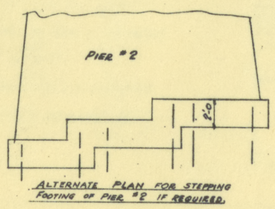


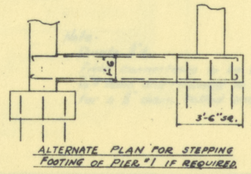












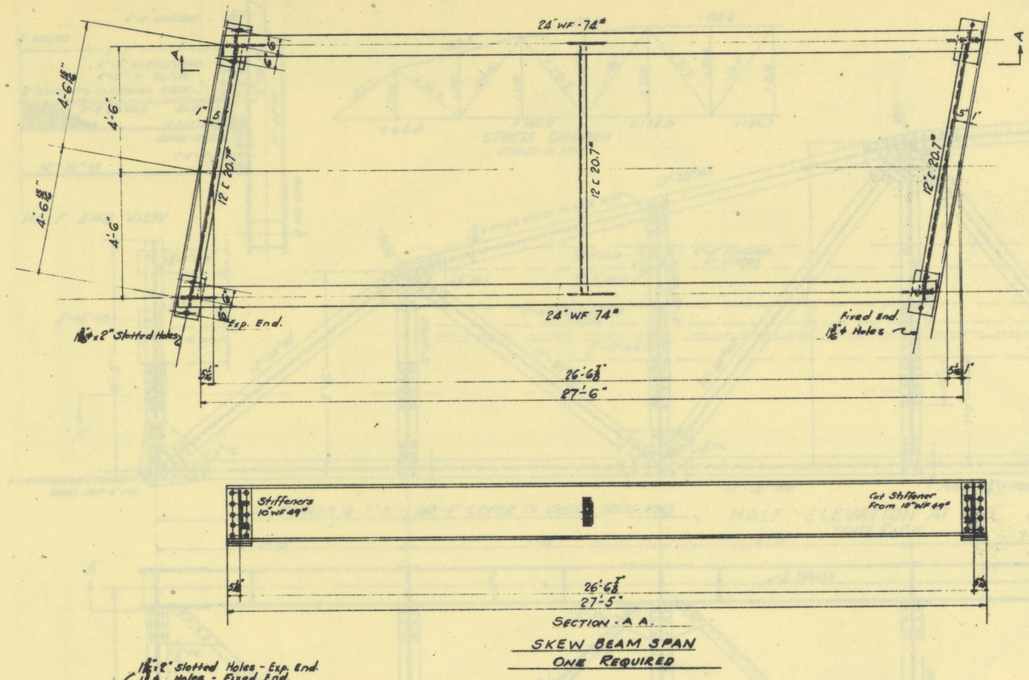
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

ITALIAN BAR BRIDGE.

SAN JOAQUIN RIVER.
LOADING H15 ROADWAY 12'
SIERRA NATIONAL FOREST.

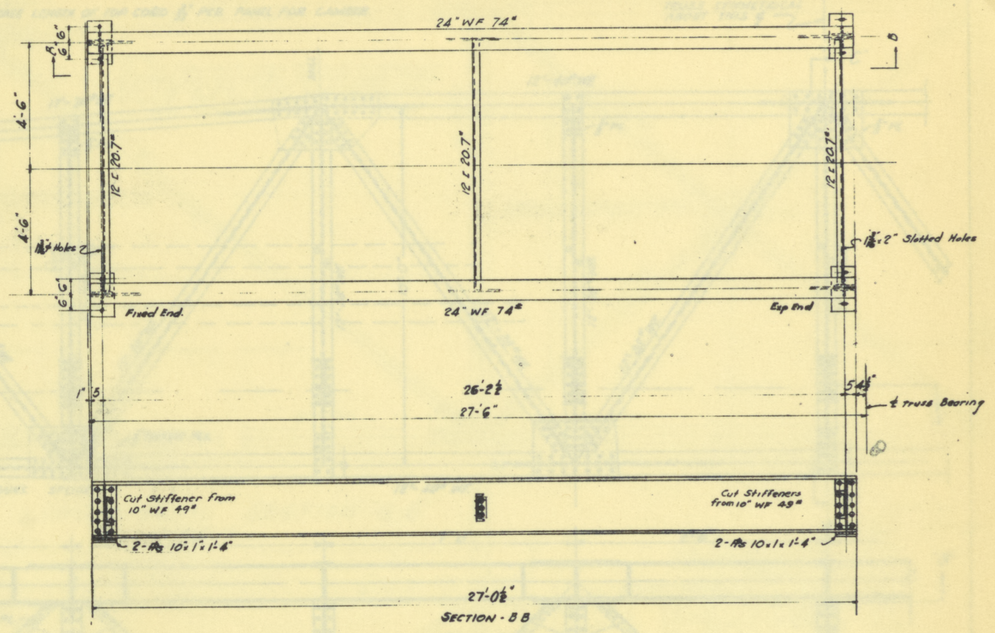
DATE: JAN. 15, 1935
SCALE: ⅜" = 1'-0"
DESIGNED J.H.L. DESIGN CHECKED R.H.L. DRAWN J.W.H. TRACED R.H.L. TRACING CHECKED R.H.L.
APPROVED BY.
SHEET No. 3 of 5

CORRECT: John R. Lawrence
BRIDGE ENGINEER.
REGIONAL ENGINEER.



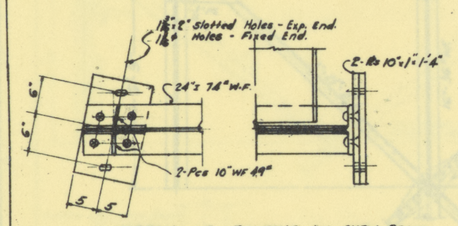
SECTION - A A.

SKEW BEAM SPAN
ONE REQUIRED.

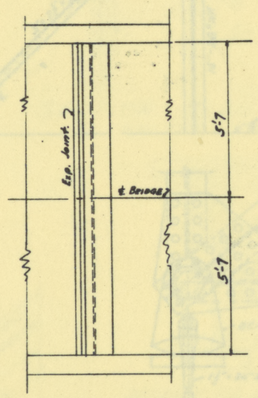


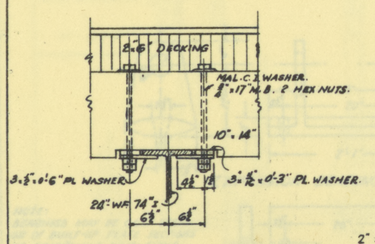
SECTION - B B

BEAM SPAN
ONE REQUIRED.

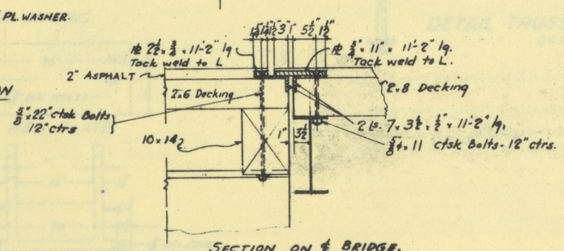


DETAIL OF BEARING ON SKEW BEAM





DETAIL FLOOR BEAM CONNECTION



SECTION ON ℄ BRIDGE.
EXPANSION JOINT.
ONE REQUIRED.

BOLT LIST.

No	Description.
16	1"ø x 15" Mach Bolts - 2 Hex nuts
48	¾"ø x 17" " " - 2 Hex nuts.
24	¾"ø x 31" " "
69	¾"ø x 14" " "
50	¾"ø x 13" " "
27	¾"ø x 17" Carriage Bolts
16	Plate Washers 4"x4"x0'-4"-1⅛"ø Hole in center
23	1" cut Washers
140	M.C.I Washers for ¾"ø Bolt.
120	" " " " ⅞"ø "
175	" " " " ⅝"ø "
48	Pcs 3"x⅜"x0'-3" (See detail)
48	Pcs 3"x⅜"x0-6" (" ")
4	⅝"ø x 9" Mach Bolts
4	⅝"ø x 7" " "
11	⅝"ø x 22" ctsk. Bolts
11	⅝"ø x 11" " "

Note-
Rivets ¾"ø.
Field connections to be sub-punched to 7/8"ø holes and reamed to a snug fit for a ¾" diam. rolled body bolts.

U. S. DEPARTMENT OF AGRICULTURE.
FOREST SERVICE
REGION 5

ITALIAN BAR BRIDGE - SAN JOAQUIN RIVER.

LOADING H15 ROADWAY 12'

SIERRA NATIONAL FOREST.

DATE: Jan. 15, 1935

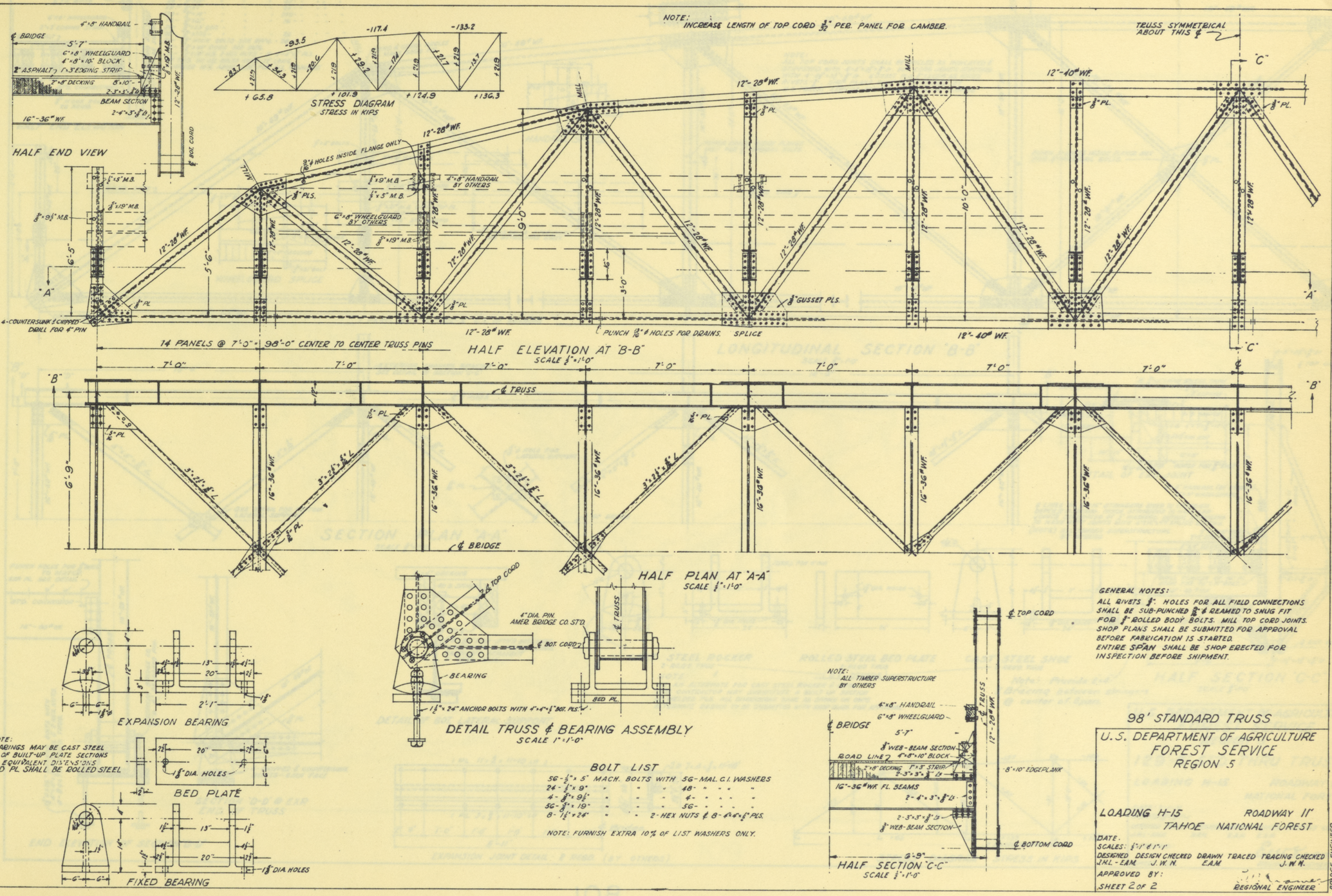
SCALES:

DESIGNED	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED
J.H.L - R.H.L.	J.W.P.	R.H.L.	R.H.L.	

APPROVED BY. P. W. Kramer

SHEET 4 of 5 REGIONAL ENGINEER

Correct John H. Lawson Bridge Engineer


HALF END VIEW
4"×8" HANDRAIL
℄ BRIDGE
5'-7"
6"×8" WHEELGUARD
6"×8"×10" BLOCK
3" ASPHALT
1"×3" EDGING STRIP
2"×8" DECKING
8"×10"
2-5"×5"×⅜" L
BEAM SECTION
2-4"×3"×⅜" L
16"-36" WF
⅜" PL.
12"-28" WF.
℄ BOT. CORD
STRESS DIAGRAM
STRESS IN KIPS
-43.7
-93.5
-117.4
-133.2
+21.2
+54.3
+21.9
-78.6
+21.9
+101.9
+21.9
-124
+21.9
+124.9
+21.7
-134
+21.9
+130.3
+65.8
NOTE:
INCREASE LENGTH OF TOP CORD 3/32" PER PANEL FOR CAMBER.
TRUSS SYMMETRICAL ABOUT THIS ℄
"C"
12"-40" WF.
MILL
12"-28" WF.
⅜" PL.
⅞" HOLES INSIDE FLANGE ONLY
⅞" PLS.
⅝"×19" M.B.
⅝"×5" M.B.
4"×8" HANDRAIL BY OTHERS
6"×8" WHEELGUARD BY OTHERS
⅝"×9½" M.B.
9'-0"
10'-0"
5'-6"
6'-5"
3'-0"
"A"
⅜" PL
⅜" GUSSET PLS.
4-COUNTERSUNK & CHIPPED DRILL FOR 4" PIN
PUNCH 13/16" ⌀ HOLES FOR DRAINS. SPLICE
14 PANELS @ 7'-0" = 98'-0" CENTER TO CENTER TRUSS PINS
HALF ELEVATION AT "B-B"
SCALE ⅛"=1'-0"
7'-0"
"B"
℄ TRUSS
⅝" PL
⅜" PL
3"×2½"×⅜" L
16"-36" WF
9'-6"
℄ BRIDGE
HALF PLAN AT "A-A"
SCALE ⅛"=1'-0"
℄ TOP CORD
4" DIA. PIN, AMER. BRIDGE CO. STD.
℄ BOT. CORD
BEARING
BED PL.
1½"×24" ANCHOR BOLTS WITH 4"×4"×⅜" BOT. PLS.
DETAIL TRUSS ℄ BEARING ASSEMBLY
SCALE 1"=1'-0"
EXPANSION BEARING
NOTE:
BEARINGS MAY BE CAST STEEL OR OF BUILT-UP PLATE SECTIONS OF EQUIVALENT DIMENSIONS
BED PL SHALL BE ROLLED STEEL
BED PLATE
1⅛" DIA. HOLES
FIXED BEARING
BOLT LIST
56-⅞"×5" MACH. BOLTS WITH 56-MAL. C.I. WASHERS
24-¾"×9" " " " 48- " " "
4-⅞"×9½" " " " 4- " " "
56-⅞"×19" " " " 56- " " "
8-1¼"×24" " " 2-HEX NUTS ℄ 8-4"×4"×⅝" PLS.
NOTE: FURNISH EXTRA 10% OF LIST WASHERS ONLY.
NOTE:
ALL TIMBER SUPERSTRUCTURE BY OTHERS
℄ TOP CORD
℄ TRUSS
12"-28" WF.
4"×8" HANDRAIL
6"×8" WHEELGUARD
℄ BRIDGE
5'-7"
⅝" WEB-BEAM SECTION
ROAD LINE?
6"×8"×10" BLOCK
2"×8" DECKING
1"×3" STRIP
2-5"×3"×⅜" L
8"×10" EDGEPLANK
16"-36" WF. FL. BEAMS
2-4"×3"×⅜" L
2-5"×3"×⅜" L
⅜" WEB-BEAM SECTION
2'-9"
℄ BOTTOM CORD
HALF SECTION "C-C"
SCALE ⅛"=1'-0"
GENERAL NOTES:
ALL RIVETS ⅞": HOLES FOR ALL FIELD CONNECTIONS SHALL BE SUB-PUNCHED 13/16" ⌀ REAMED TO SNUG FIT FOR ⅞" ROLLED BODY BOLTS. MILL TOP CORD JOINTS.
SHOP PLANS SHALL BE SUBMITTED FOR APPROVAL BEFORE FABRICATION IS STARTED.
ENTIRE SPAN SHALL BE SHOP ERECTED FOR INSPECTION BEFORE SHIPMENT.
98' STANDARD TRUSS
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
LOADING H-15 ROADWAY 11'
TAHOE NATIONAL FOREST
DATE:
SCALES: ⅛"=1'-0"
DESIGNED J.H.L.-E.A.M. DESIGN CHECKED J.W.N. DRAWN E.A.M. TRACED TRACING CHECKED J.W.N.
APPROVED BY:
SHEET 2 OF 2
REGIONAL ENGINEER
BRIDGE ENGINEER

LIST OF SUPERSTRUCTURE BOLTS (BY OTHERS)

60 -	¾"x 5"	MACH. BOLTS WITH	60-MAL. C.I. WASHERS
24 -	¾"x 9"	" " "	48- " " "
12 -	¾"x 7"	" " "	24 - " " "
120 -	¾"x 14"	" " "	240 - " " "
16 -	¾"x 31"	" " "	16 - " " "
26 -	¾"x 2½ CSK.	" " "	26 " " "
26 -	¾"x 23"	" " "	26 " " "
28 -	¾" HOOK BOLTS SEE DW'G.		28 - " " "
7 -	¾"x 30" RODS SEE DW'G.		
8 -	¾"x 18" M.B. 2 HEX NUTS - 8 - 6"x 6"x ½" PLS.		

3" THD. ON ALL BOLTS OVER 12" LONG
FURNISH 10% ABOVE LIST FOR ALL WASHERS

NOTE:
INCREASE LENGTH OF TOP CORD ¼" PER PANEL FOR CAMBER

NOTE:
ALL TOP CORD JOINTS SHALL BE MILLED AS INDICATED & STIFFENED WITH 4 - 5"x 3½"x ⅜" ℓ. BOT. CORD JOINTS STIFFENED WITH 4 - 3½"x 3½"x ⅜" ℓ. GUSSET PLS. ⅜" EXCEPT AS NOTED. RIVETS ⅞". SHOP PLANS MUST BE APPROVED BY U.S. FOREST SERVICE BEFORE FABRICATION IS STARTED.

TRUSS SYMMETRICAL ABOUT THIS ℄

HALF END ELEVATION

WHEELGUARD SPLICE

HANDRAIL SPLICE

PUNCH HOLES INSIDE FLANGE ONLY FOR ¾" HANDRAIL BOLTS.

PUNCH ¾" HOLES INSIDE FLANGE ONLY FOR ¾" HANDRAIL BOLTS.

DRILL FOR 4" PIN

7 PANEL @ 18'-6" = 129'-6" C.C. OF BEARING

LONGITUDINAL SECTION "B-B"
SCALE ⅛" = 1'-0"

SECTION PLAN "A-A"
SCALE ⅛" = 1'-0"

SEE DETAIL FOR BOTTOM LATERAL SUPPORT

EXTERIOR CHANNEL BRACING SEE DETAIL @ SECTION "C-C"

DETAIL OF EXP. JOINT

& LINES OF 6"x16" STRINGERS SIZED TO UNIFORM DEPTH @ PL. BEAMS. INSIDE STRINGERS TO HAVE LAP JOINTS SEPARATED BY 1" WASHERS. OUTSIDE STRINGERS TO HAVE BUTT JOINTS WITH 6"x16"x⅜" SPLICE BLOCKS.
(NOTE) ALL TIMBER SUPERSTRUCTURE BY OTHERS

HALF SECTION "C-C"
SCALE ⅛" = 1'-0"

PUNCH HOLES FOR ⅞" BOLTS TO MATCH EXP. PL. SEE DETAIL

AMERICAN BRIDGE CO. ST'D. ℄ ACCESSED THR.

END ELEVATION OF SECTION "D-D"

SECTION "D-D" @ EXP. END OF TRUSS

4- CHIPPED & COUNTERSUNK RIVETS - EACH FACE

DETAIL OF BOT. LATERAL SUPPORT

2" x 4" DECKING
40 D. SPIKES
4" x 6"
2" x 4"
⅝" ℄ x 30" ROD - 8" TH'D. BOTH ENDS 3 HEX. NUTS & 1 - MAL. C.I. WASHER. FABRICATE STRAIGHT 7 - REQ'D THUS.

CAST STEEL ROCKER
2 - REQ'D THUS

ROLLED STEEL BED PLATE
2 - REQ'D THUS (BY OTHERS)

CAST STEEL SHOE
2 - REQ'D. THUS

NOTE:
AS AN ALTERNATE FOR CAST STEEL ROCKER & SHOE THIS CONTRACTOR MAY SUBSTITUTE A BUILT UP SECTION OF WELDED PLS. ALL DIMENSIONS SAME AS SHOWN ON DW'G. ALTERNATE DESIGN TO BE SUBMITTED WITH SHOP DWGS. FOR APPROVAL.

Note: Provide 2"x4" X Bracing between stringers @ center of Span.

EXPANSION JOINT DETAIL - 2 REQ'D. (BY OTHERS)

STRESS DIAGRAM — STRESS IN KIPS

7 PANELS @ 18'-6" = 129'-6"

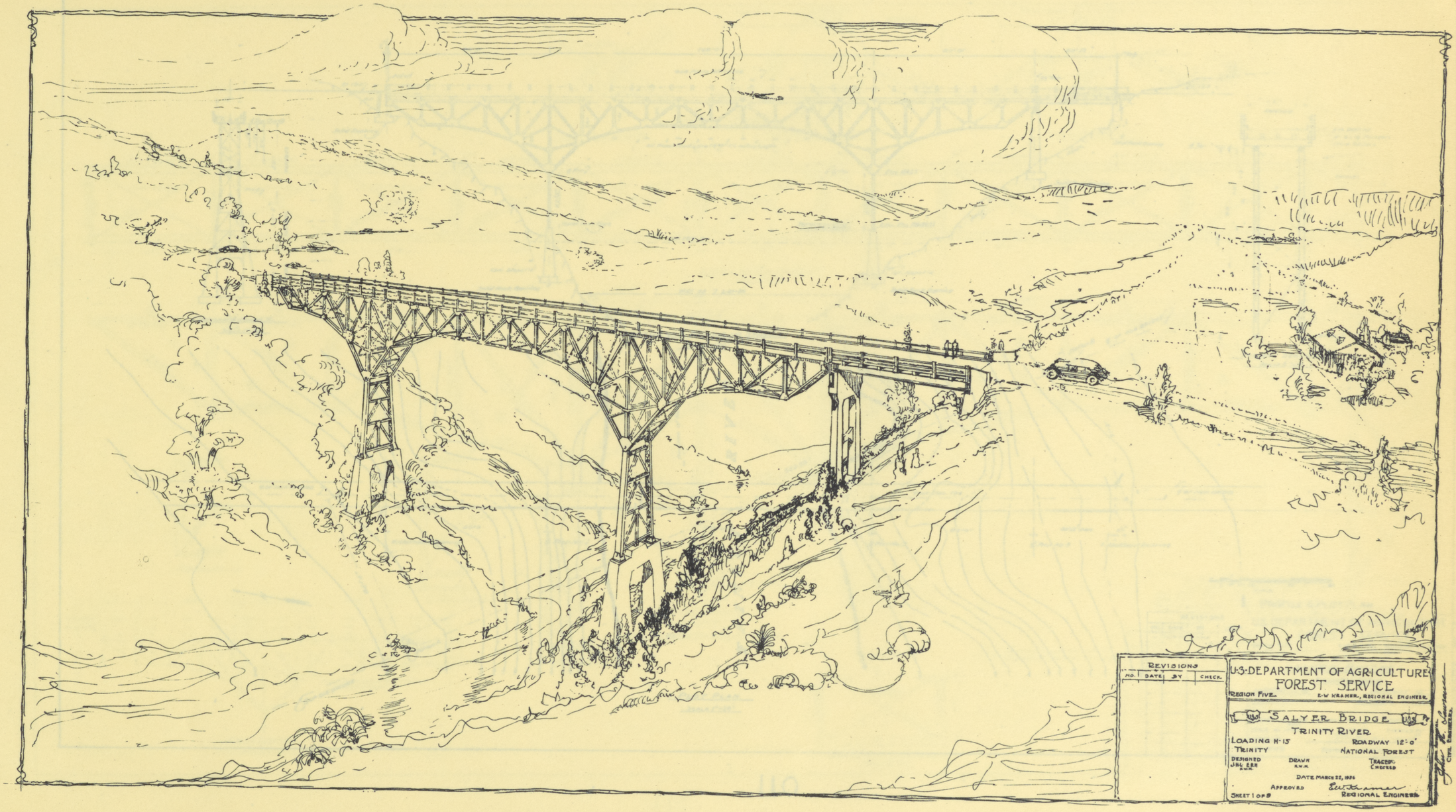
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

129'-6" ST'D. THRU TRUSS

LOADING H-15 ROADWAY 12'
NATIONAL FOREST

DATE: 1-11-34
SCALES: ⅛"=1'-0" 1"=1'
DESIGNED J.N.L.-N.W.M. DESIGN N.F.M. CHECKED E.A.M. DRAWN E.A.M. TRACED TRACING CHECKED
APPROVED: E.W. Kramer REGIONAL ENGINEER
SHEET OF

CORRECT: Edw. H. Lawrence BRIDGE ENGINEER

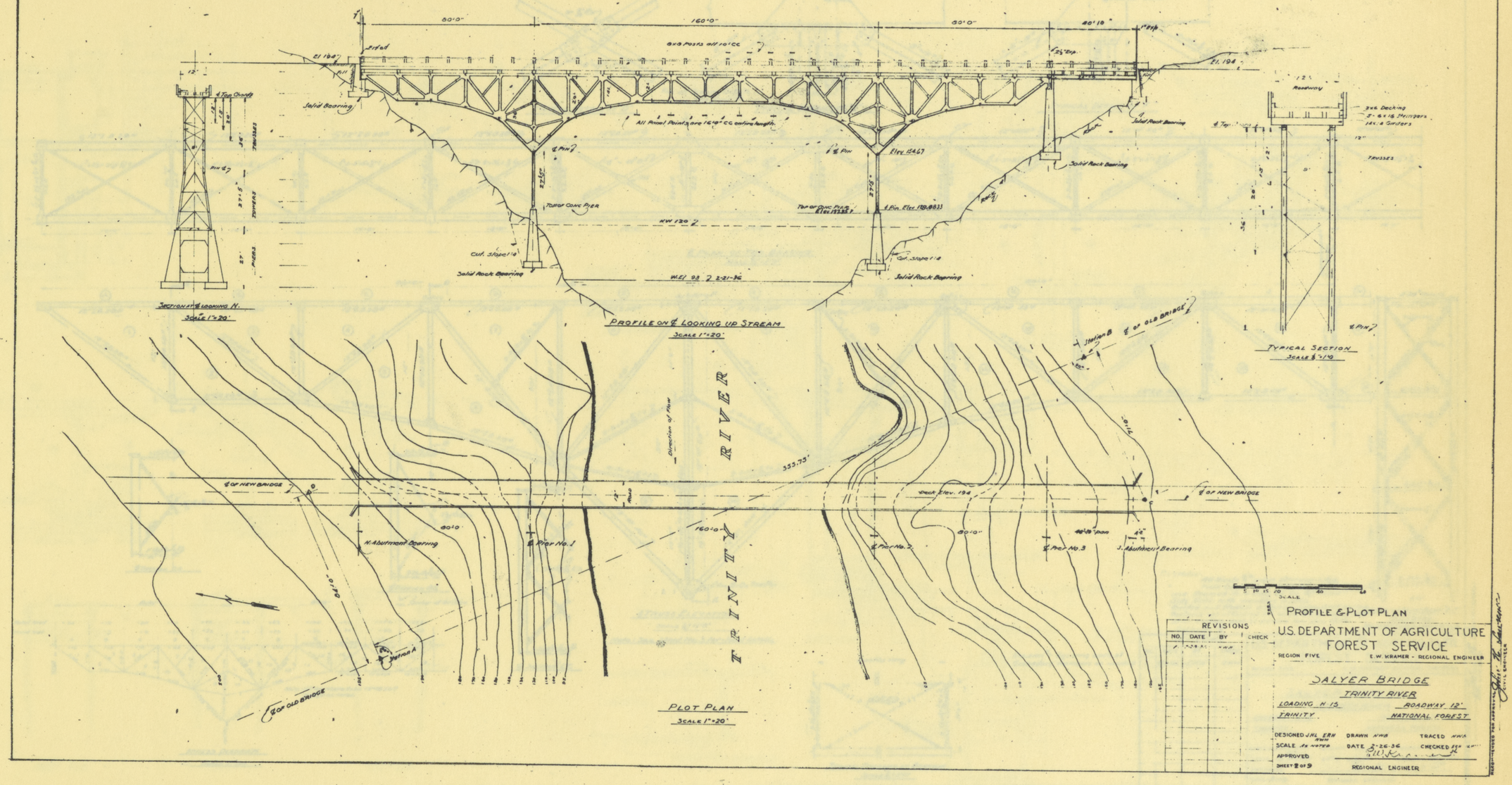


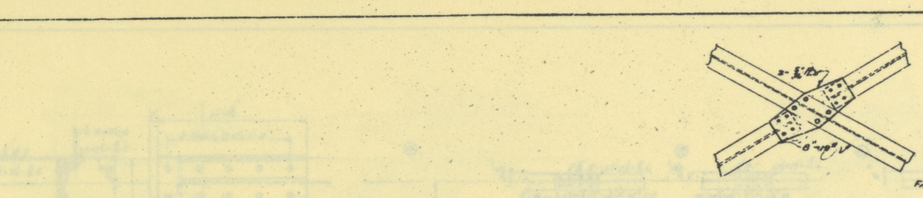
REVISIONS			
NO.	DATE	BY	CHECK.

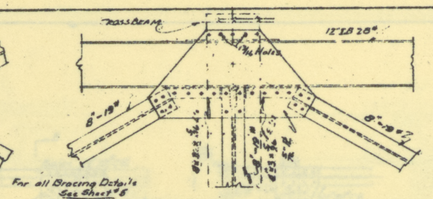
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE — E.W. KRAMER, REGIONAL ENGINEER.

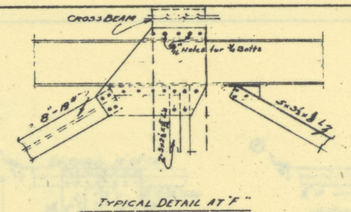
SALYER BRIDGE
TRINITY RIVER
LOADING H-15 — ROADWAY 12'-0"
TRINITY — NATIONAL FOREST
DESIGNED J.H.L. E.R.R. K.W.K. — DRAWN K.W.K. — TRACED — CHECKED
DATE MARCH 22, 1926
APPROVED E.W. Kramer REGIONAL ENGINEER
SHEET 1 OF 9

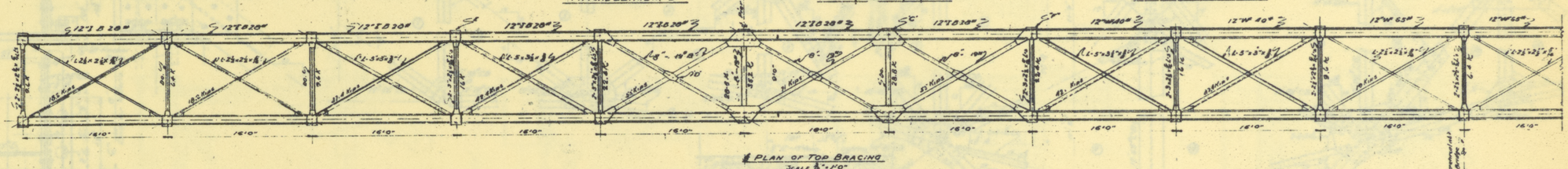
John H. Lawrence CIVIL ENGINEER

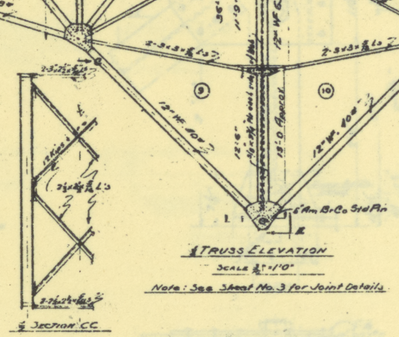

50'-0"
160'-0"
50'-0"
40'-10"
6x8 Posts at 10'-0" cc
All Panel Points are 16'-0" cc centre lengths
Solid Bearing
Solid Rock Bearing
Top of Conc Pier
Top of Conc Piers
Elev 194.67
Elev 193.833
HW 120.2
LW 93.2 2-21-36
Cut Slope 1:4
Cut. Slope 1:4
Roadway
3x6 Decking
2-6x16 Stringers
2-6x16 Girders
TRUSSES
SECTION AT ℄ LOOKING N.
Scale 1"=20'
PROFILE ON ℄ LOOKING UP STREAM
Scale 1"=20'
TYPICAL SECTION
Scale 3/4"=1'0
TRINITY RIVER
Direction of Flow
℄ OF NEW BRIDGE
℄ OF OLD BRIDGE
N. Abutment Bearing
℄ Pier No. 1
℄ Pier No. 2
℄ Pier No. 3
S. Abutment Bearing
Deck Elev. 194
553.75'
160'-0"
80'-0"
Section A
Section B
PLOT PLAN
Scale 1"=20'
SCALE
PROFILE & PLOT PLAN
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE
E.W. KRAMER - REGIONAL ENGINEER
SALYER BRIDGE
TRINITY RIVER
LOADING H 15
ROADWAY 12'
TRINITY
NATIONAL FOREST
DESIGNED JRL ERH
DRAWN NWB
TRACED NWA
SCALE AS NOTED
DATE 3-26-36
CHECKED ERK
APPROVED
SHEET 2 OF 9
REGIONAL ENGINEER
REVISIONS
NO. DATE BY CHECK

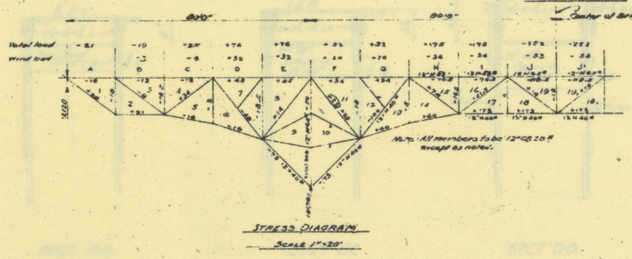


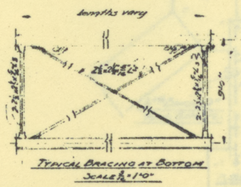


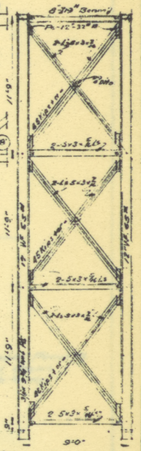












General Notes:
All Rivets 7/8" unless otherwise noted.
Field Conns. to be subpunched 7/8" holes and Reamed to a snug fit for 7/8" Fitted Body Bolts, with members in place.
Painted and Welded surfaces in contact not to be painted. Surfaces not in Contact but which will be inaccessible after erection shall be painted two coats.
Splice Rs 7/8"

Revision #1- Squaring ends of Secondary members as marked

REVISIONS			
NO	DATE	BY	CHECK
1	9/6/32	J.H.W	H.W.W

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE — L.W. KRAMER - REGIONAL ENGINEER

SALYER BRIDGE
TRINITY RIVER
LOADING N-15 — ROADWAY 12'
TRINITY — NATIONAL FOREST

DESIGNED J.H.W. DRAWN B.S. TRACED H.W.B.
SCALE AS NOTED DATE 3-3-36 CHECKED J.H.W. H.W.W.
APPROVED
SHEET 3 OF 9 REGIONAL ENGINEER

RECOMMENDED FOR APPROVAL
CHIEF ENGINEER

FIXED BEARING

DECK PL DETAIL AT EXP.

FLEY

SECT. A.A.

TYPICAL BUMPER DETAIL SECT. AA

SECT B-B.

SECT C-C

SECT D-D

PLAN-EXP. BEARING

½ TRUSS DIAGRAM

Note: Lateral Bracing at each Panel Pt. All details not otherwise shown, Symetrical about ℄ of each Tower.

Revision #1- Squaring ends of Secondary members as marked

REVISIONS

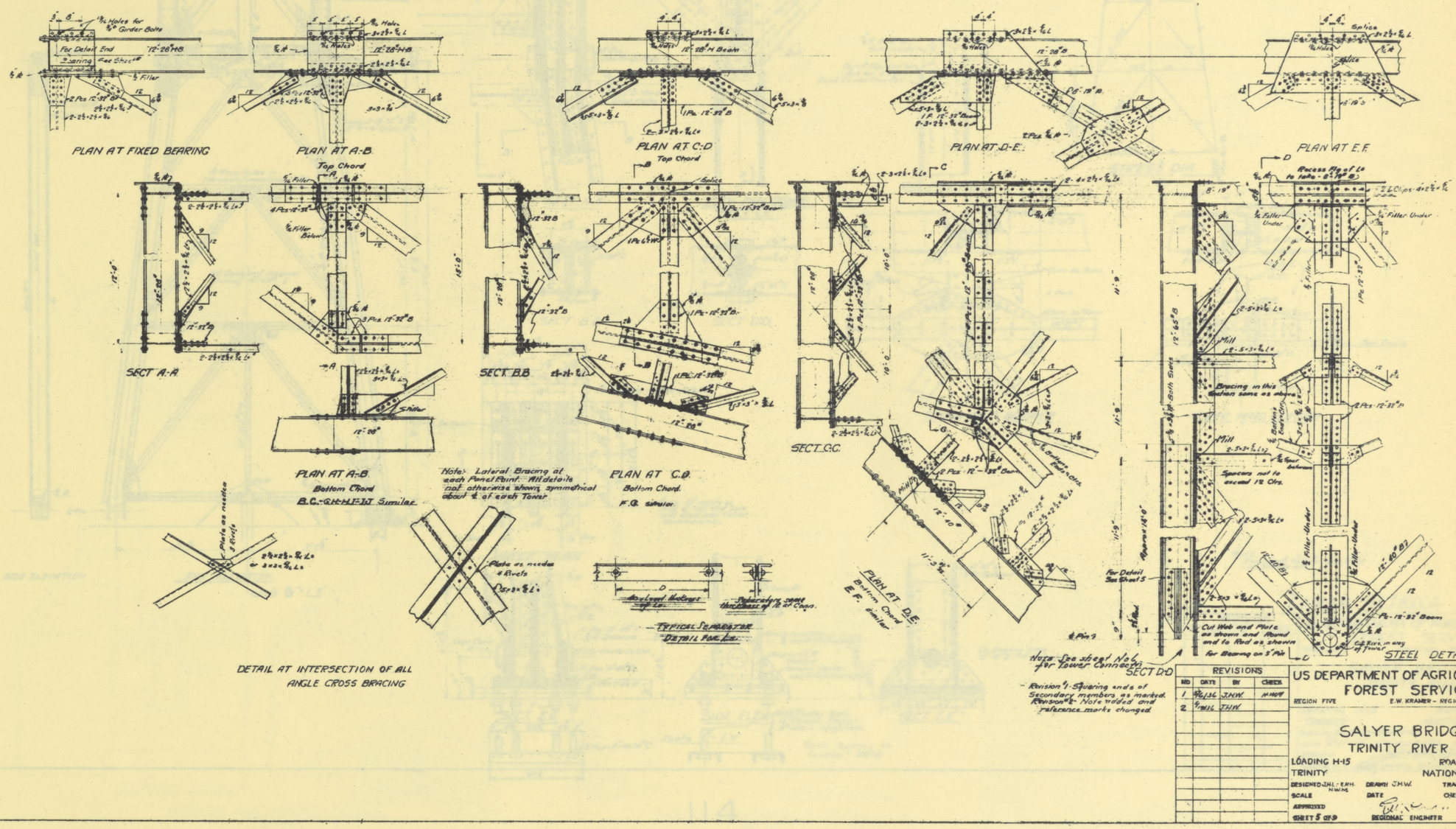
NO	DATE	BY	CHECK
1	5/16/36	J.H.W.	H.W.H.
2	7/1/36	J.H.W.	

STEEL DETAILS

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE — E.W. KRAMER - REGIONAL ENGINEER

SALYER BRIDGE
TRINITY RIVER

LOADING H-15 — ROADWAY 12'-0
TRINITY — NATIONAL FOREST
DESIGNED — DRAWN J.H.W. H.W.H. — TRACED J.H.W.
SCALE 3/16"=1'-0" — DATE Mar 9-1935 — CHECKED E.W.K. H.W.H. J.H.L.
APPROVED E.W. Kramer
SHEET 4 OF 9 — REGIONAL ENGINEER

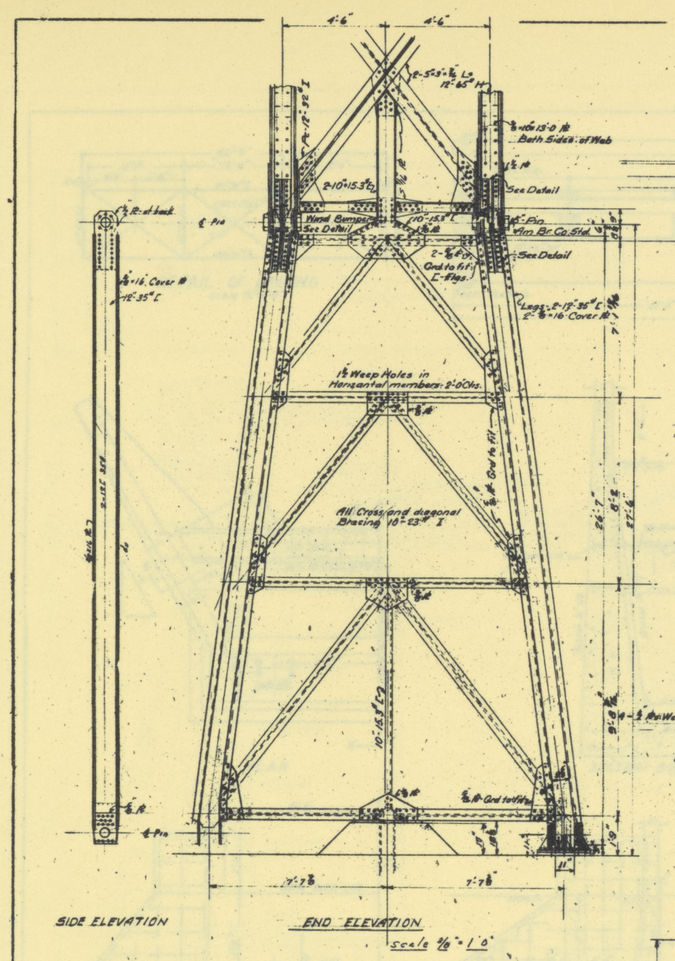


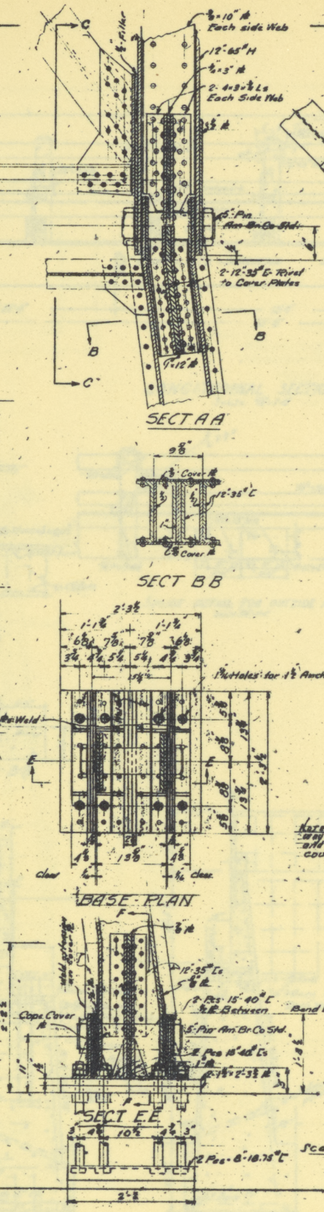
REVISIONS			
NO	DATE	BY	CHECK
1	9/6/36	J.H.W.	H.H.W.
2	4/1936	J.H.W.	

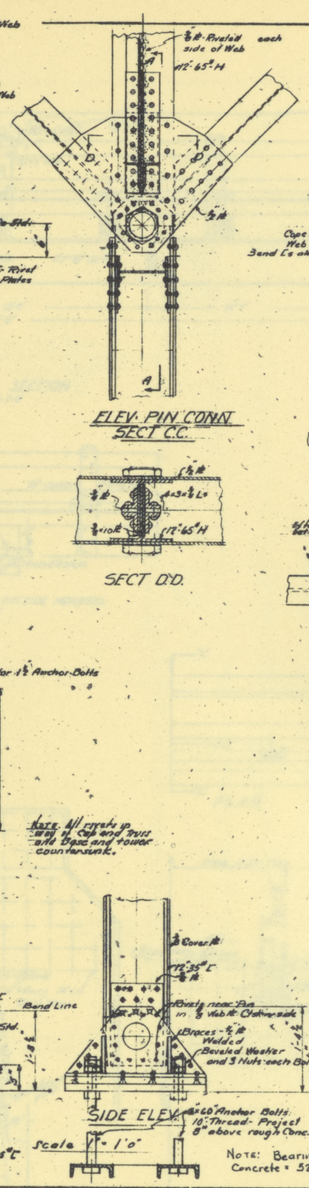
US DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE — E.W. KRAMER - REGIONAL ENGINEER

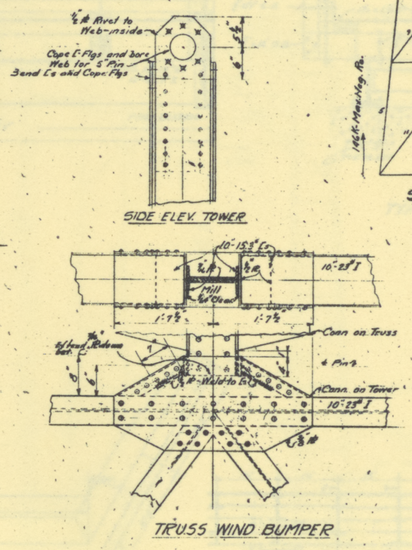
SALYER BRIDGE
TRINITY RIVER
LOADING H-15 — ROADWAY 12'
TRINITY — NATIONAL FOREST

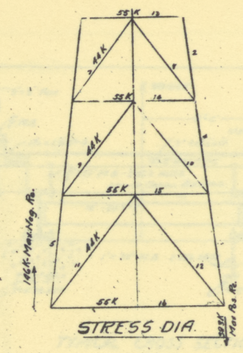
DESIGNED J.H.L. - E.R.H. - H.W.M. | DRAWN J.H.W. | TRACED J.H.W.
SCALE | DATE | CHECKED E.R.H. H.W.M. J.H.L.
APPROVED
SHEET 5 OF 9 — REGIONAL ENGINEER

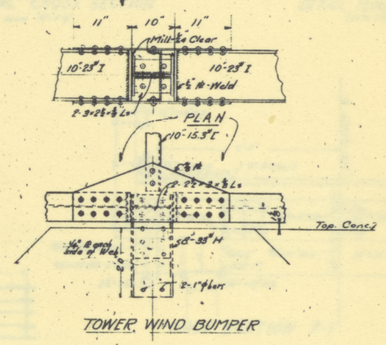












Note: See Sheet No 3 for Gen Notes on Rivets etc

TOWER DETAILS

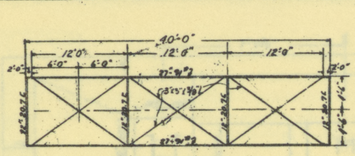
REVISIONS			
NO	DATE	BY	CHECK

US DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE — E.W. KRAMER - REGIONAL ENGINEER

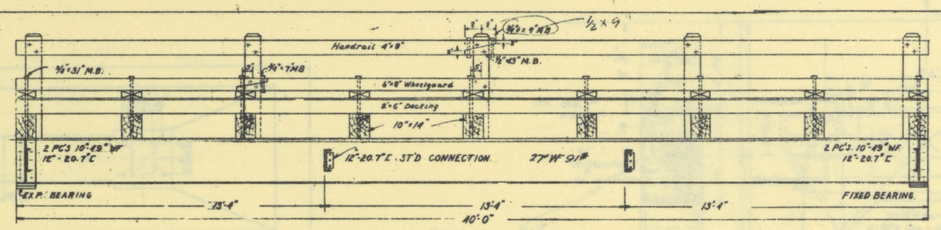
SALYER BRIDGE
TRINITY RIVER

LOADING H-15 — ROADWAY 12'
TRINITY — NATIONAL FOREST
DESIGNED JH-EB-MWH DRAWN J.H.W. TRACED J.H.W.
SCALE 3/4"=1'-0" DATE Apr 10, 1936 CHECKED M.W.H.
APPROVED
SHEET 6 OF 9 Sheets — REGIONAL ENGINEER

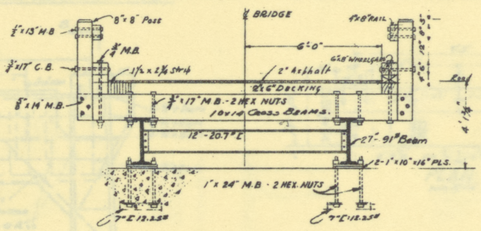
RECOMMENDED FOR APPROVAL
Chief, Br. Section (City) Engineer



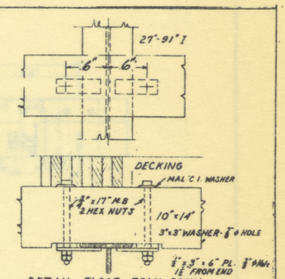
DETAIL OF BRACING
Scale 1/4"=1'-0"



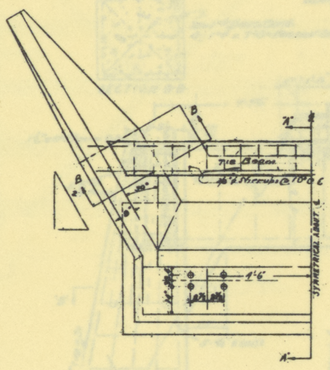
LONGITUDINAL SECTION
Scale 1/8"=1'-0"

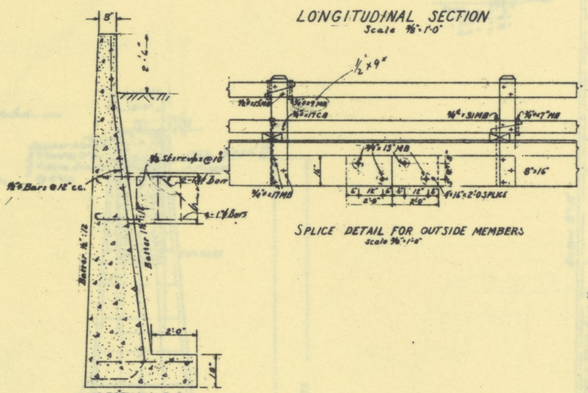


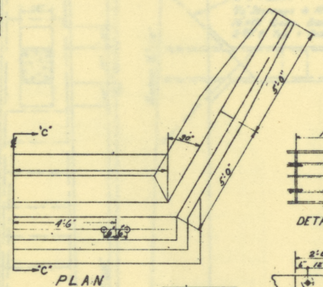
TYPICAL CROSS SECTION
Scale 1/4"=1'-0"



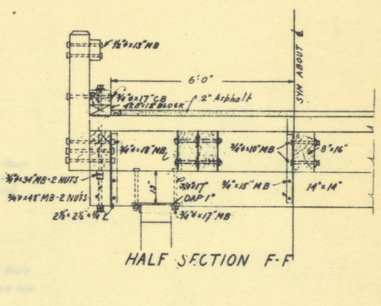
DETAIL FLOOR BEAM CONN.
Scale 1 1/2"=1'-0"



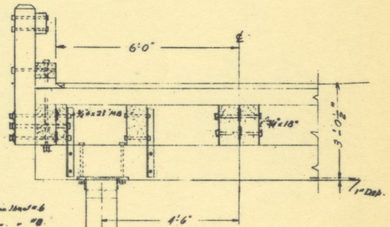




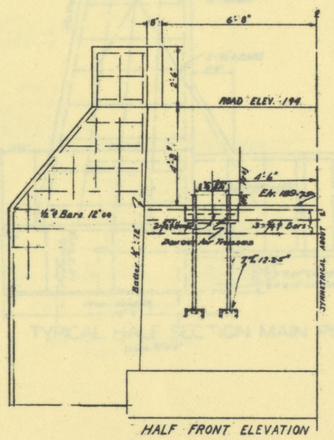
DETAIL OF WOOD STRINGER SPLICE
NOT TO SCALE

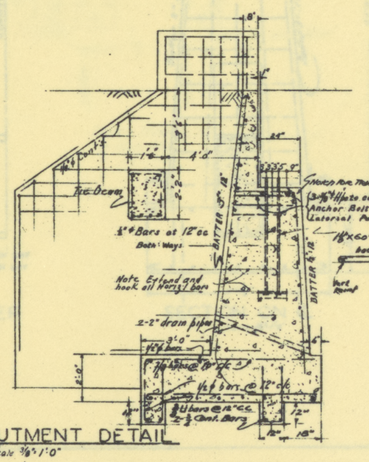


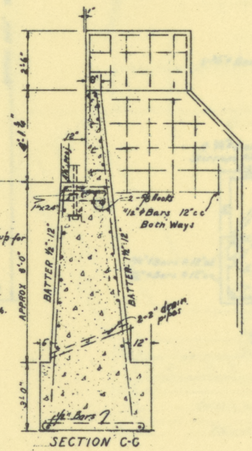
HALF SECTION F-F

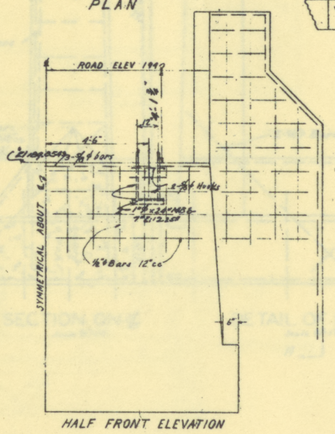


HALF SECTION G-G









SOUTH ABUTMENT DETAIL
Scale 3/8"=1'-0"

BOLT LIST

Mark	No.	Dia.	Length	Kind	No.	All Members	Washers	Remarks
1	32	1"	6'-6"	MB	3	72	WF	Anchor Bolts
2	6	1"	4'-6"	"	3	36	"	"
3	6	1"	3'-6"	"	3	24	"	"
4	152	1"	4'-3"	"	1	152	MC	Handrail
5	66	1"	3'-6"	"	1	66	"	" Splice
6	462	1"	3'-6"	"	1	66	"	Wheelguard
7	18	1"	3'-3"	"	1	18	"	"
8	152	1"	1'-7"	CB	1	152	"	"
9	30	1"	1'-4"	MB	1	30	"	Posts to cross Beam
10	34	1"	2'-1"	"	1	34	"	Wheelguard Splice
11	10	1"	8'-8"	"	2	88	"	"
12	36	1"	1'-1"	"	2	72	MC	1.36 3/4" Washer 7/8" Hole 3"x3"x1/4" "
13	64	1"	1'-1"	"	2	128	"	"
14	24	1"	2'-1"	"	1	24	"	Splice
15	286	1"	1'-8"	"	1	286	"	" & Posts
16	130	1"	1'-5"	"	1	130	"	"
17	78	1"	1'-3"	"	1	78	"	"
18	70	1"	1'-0"	"	1	70	"	"
19	4	1"	1'-8"	"	2	8	"	Bolts & Nuts
20	64	1"	1'-6"	"	2	128	"	do - 10"
21	8	1"	10"	"	1	8	"	do - 18"

CONCRETE ABUTMENTS & GENERAL DECK DETAILS

REVISIONS

No.	Date	By	Check

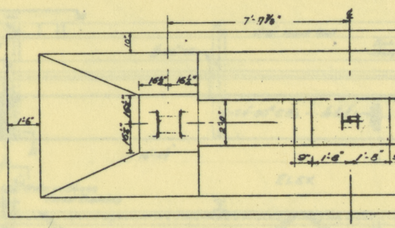
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE — E.W. KRAMER - REGIONAL ENGINEER

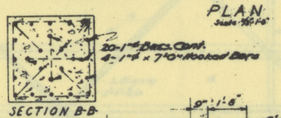
SALYER BRIDGE
TRINITY RIVER

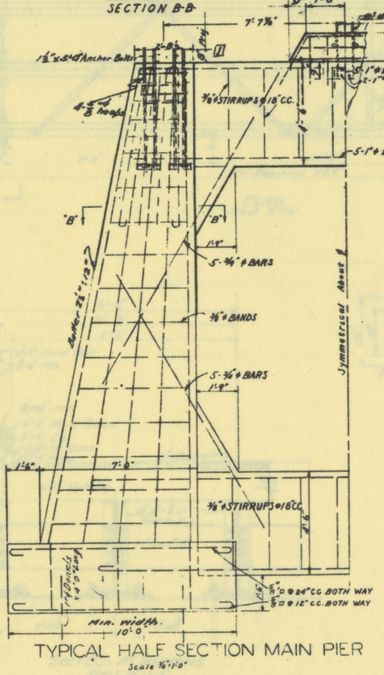
LOADING H-15 — ROADWAY 12'
TRINITY — NAT'L FOREST

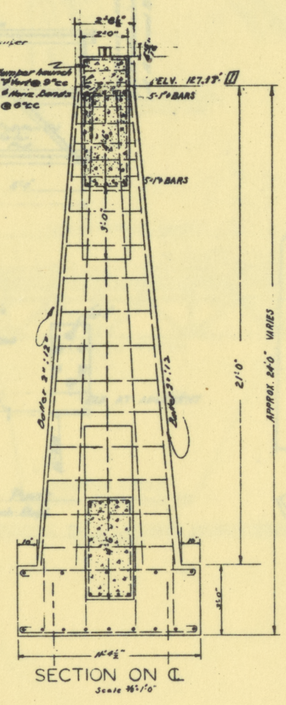
DESIGNED JNL ERH — DRAWN RAC — TRACED RAC
SCALE-3/4"=1'-0" — DATE 3-3-36 — CHECKED ERH JNL
APPROVED E.W. Kramer JNL
SHEET 7 of 9 — REGIONAL ENGINEER

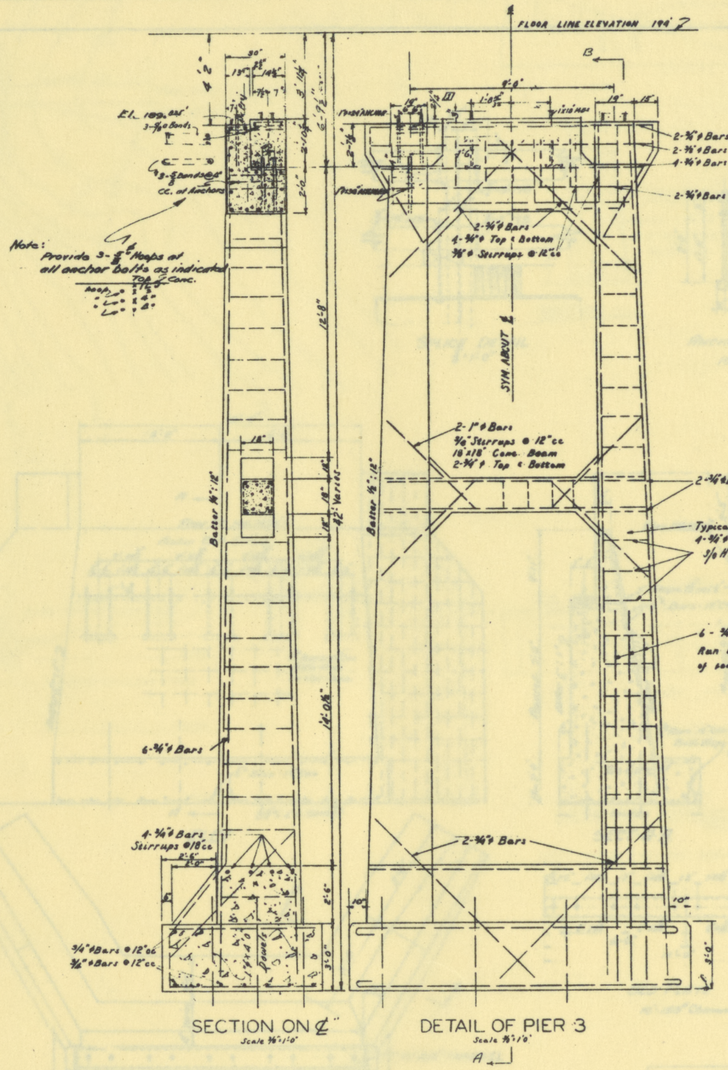
RECOMMENDED FOR APPROVAL John M. Clarkson CIVIL ENGINEER

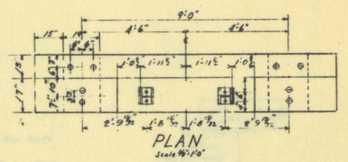












CONCRETE PIERS

REVISIONS			
NO.	DATE	BY	CHECK
1	4-2-37	NWH	ECW

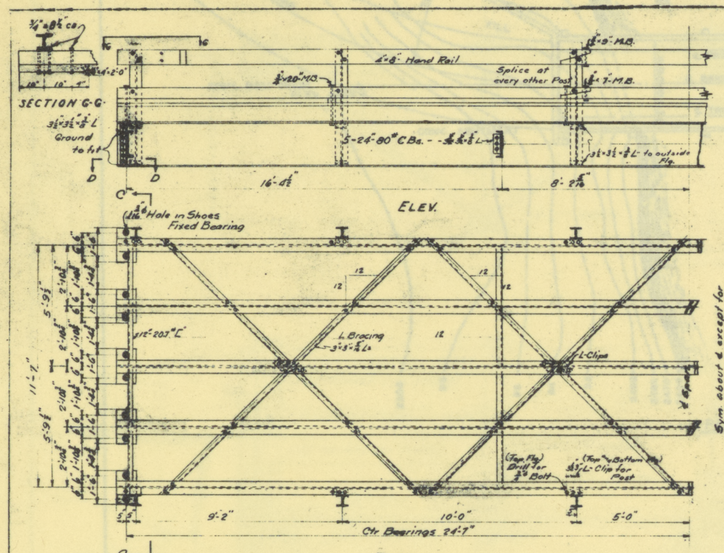
US DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE — E. W. KRAMER - REGIONAL ENGINEER

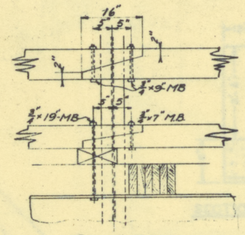
SALYER BRIDGE
TRINITY RIVER

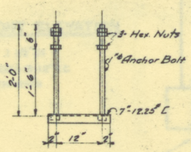
LOADING H-15 — ROADWAY 12'
TRINITY — NATL FOREST

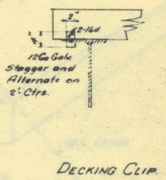
DESIGNED JHL ERH — DRAWN RAC — TRACED RAC
SCALE ⅜"=1'0" — DATE 3-3-36 — CHECKED ERH NWH JHL
APPROVED
SHEET 8 of 9
REGIONAL ENGINEER

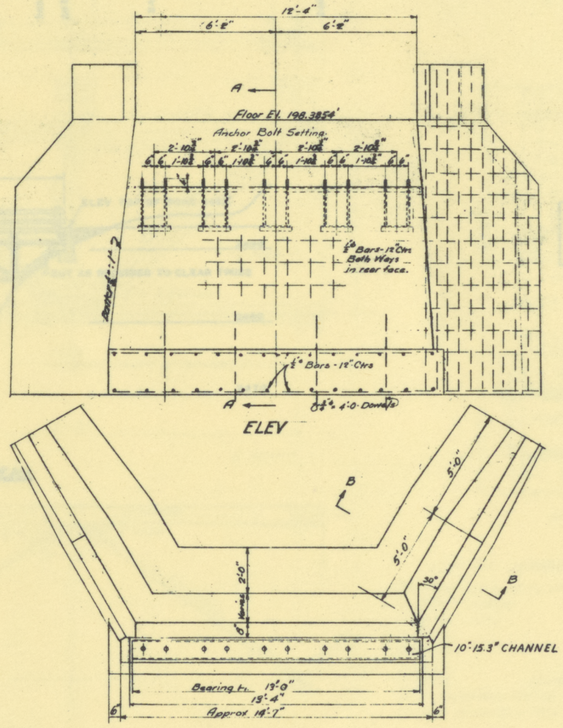
RECOMMENDED FOR APPROVAL [illegible] CIVIL ENGINEER

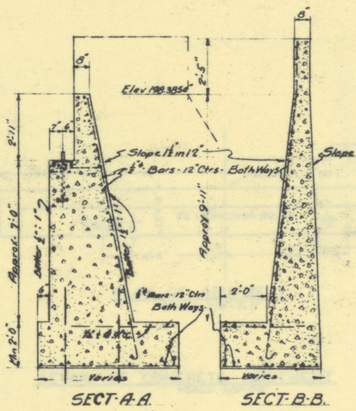


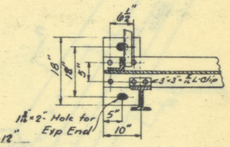


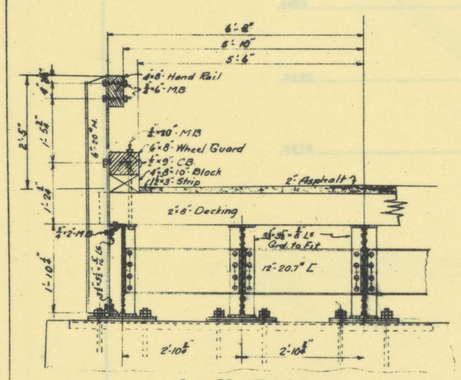


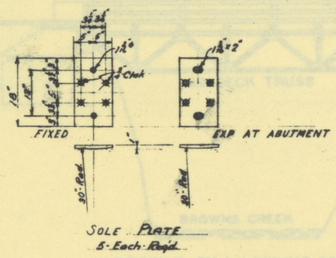


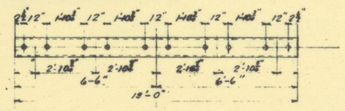












BOLT LIST

No.	Kind	Item
20	1"x20" M.B.	Anchor Bolts-3 Nut
12	3/4"-20" M.B.	Wheel Guard
8	3/4"-9" M.B.	H.R. Splice
4	3/4"-7" M.B.	W.G. Splice
48	3/4"-6" M.B.	Hand Rail / Post
12	3/4"-9" C.B.	Wheel Guard
24	3/4"-6" M.B.	Hand Rail
48	3/4" O.G. Washers	

REVISIONS

No.	Date	Items	By	Authority

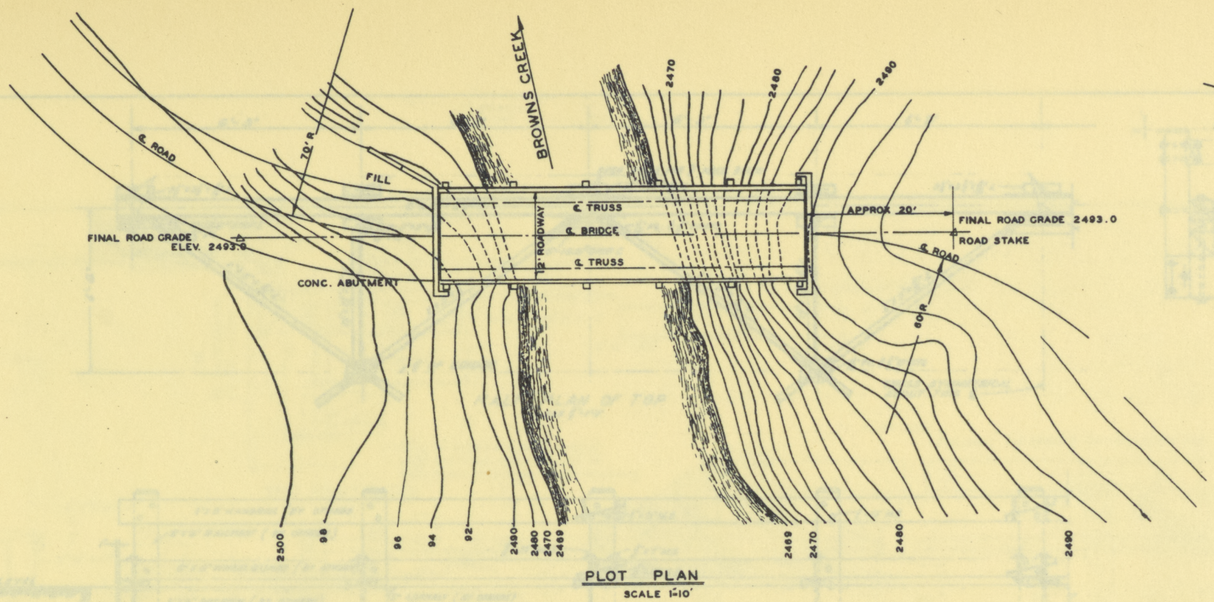
APPROACH SPAN

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
SALYER BRIDGE
TRINITY RIVER
LOADING H-15 ROADWAY 11'
TRINITY NATIONAL FOREST

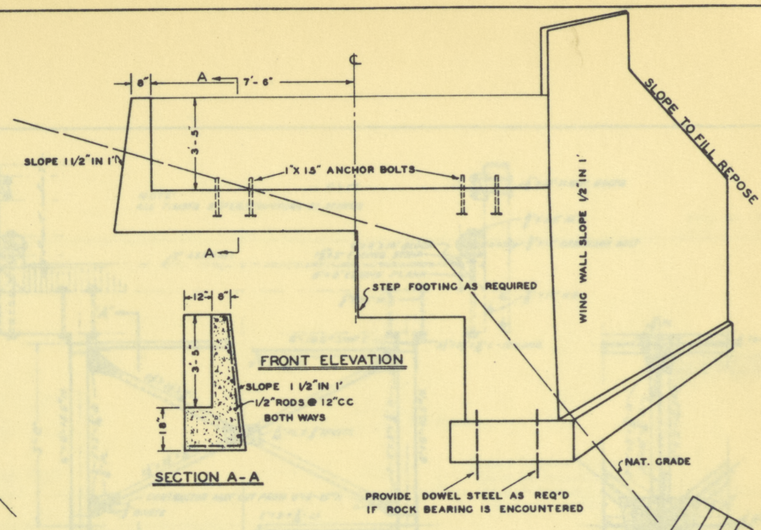
Date: Jan 9-1936
Scales: 3/16"=1'-0" 1"=1'-0"
Designed JHL L&N Design Checked L&N Drawn JHW Traced JHW Tracing Checked NWH
Approved By:
Sheet 9 of 9

Regional Engineer

Carson Engr. U.S. Surveyor
Dist. Engineer

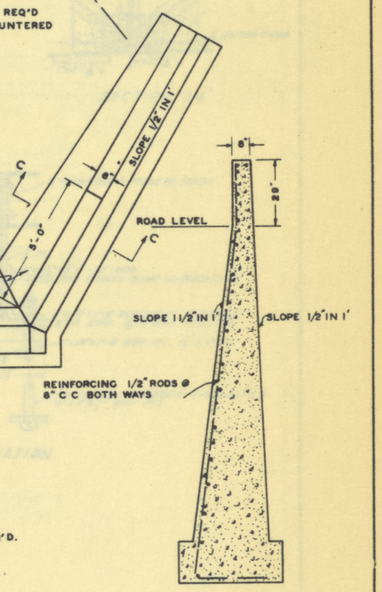


PLOT PLAN
SCALE 1"=10'



FRONT ELEVATION

SECTION A-A

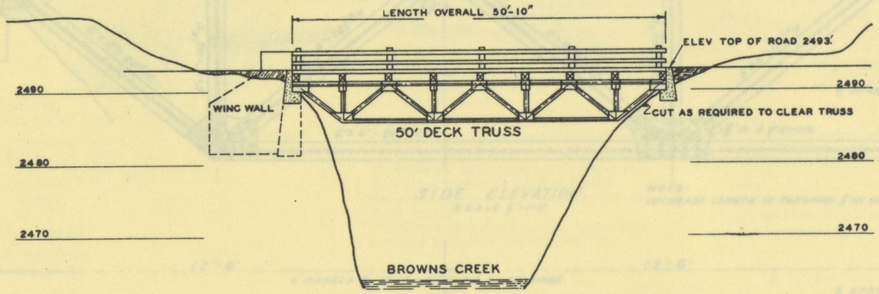


PLAN OF ABUTMENT
SCALE 3/8"=1'-0"

SECTION C-C

DETAIL OF CONCRETE ABUTMENT
SCALE 3/8"=1'-0"

NOTE OTHER ABUTMENT SIMILAR EXCEPT NO WING WALL REQ'D.



PROFILE ON ℄ LOOKING DOWNSTREAM
SCALE 1"=10'

US DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

UPPER BROWNS CREEK BRIDGE

LOADING H 15 ROADWAY 12 FT.

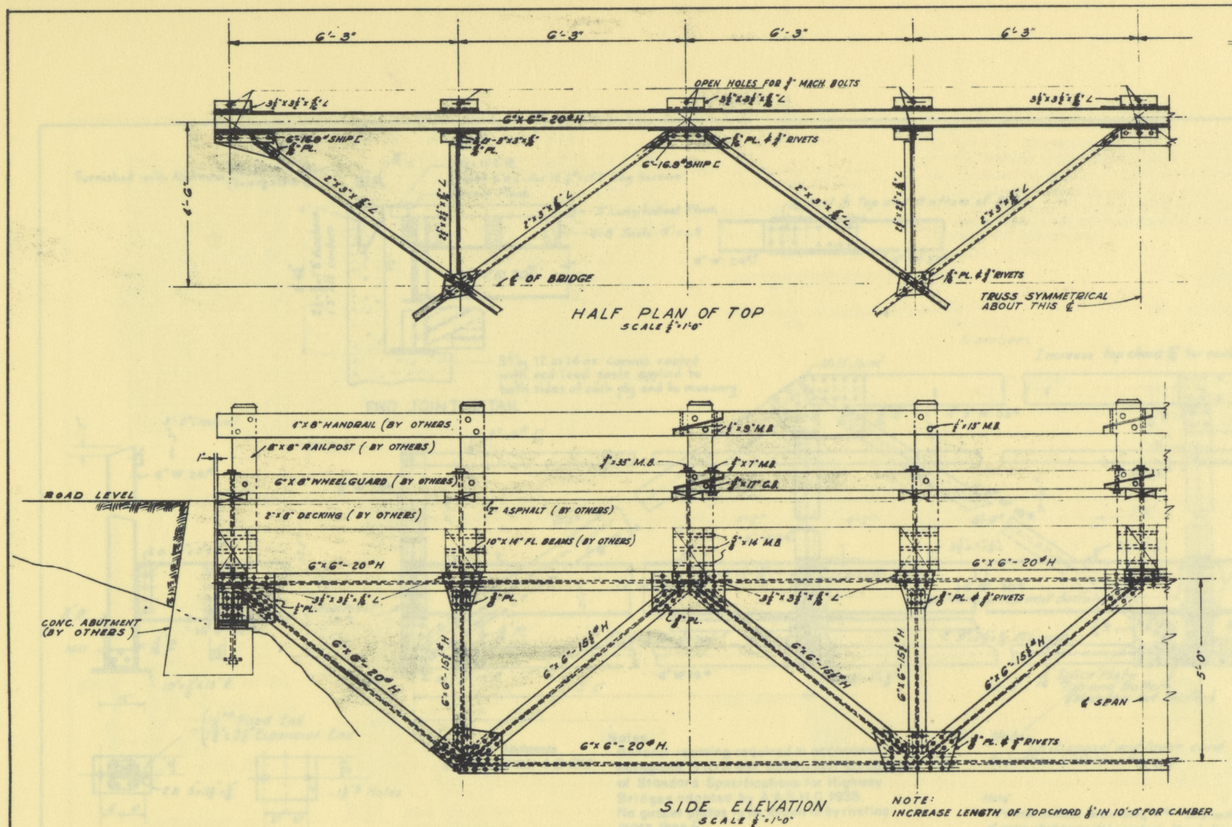
TRINITY NATIONAL FOREST

SCALES 1"=10' & 3/8"=1'-0"
DATE

DESIGNED	DESIGN CHECKED	DRAWN	TRACED	TRACING CHECKED
J.H.L.: E.A.M.	N.F.M.	E.A.M.		R.A.C.

APPROVED BY Ed Kramer
REGIONAL ENGINEER

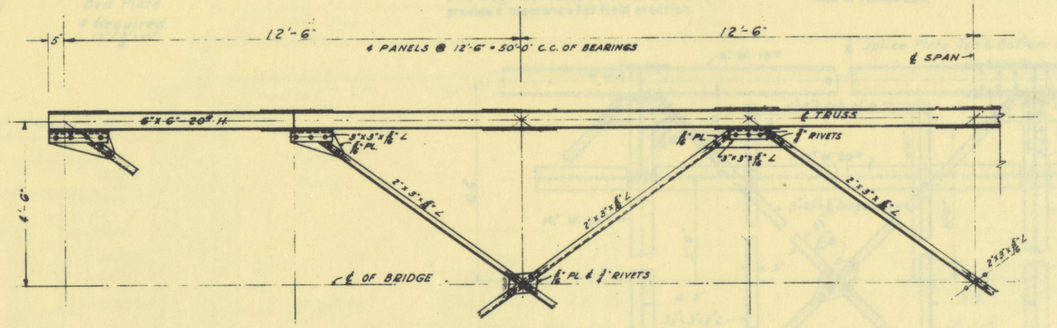
SHEET 1 OF 2



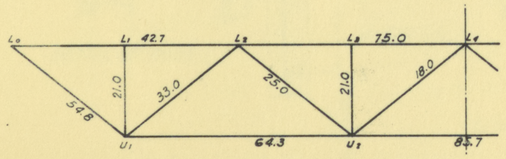
HALF PLAN OF TOP
SCALE ½"=1'-0"

SIDE ELEVATION
SCALE ½"=1'-0"

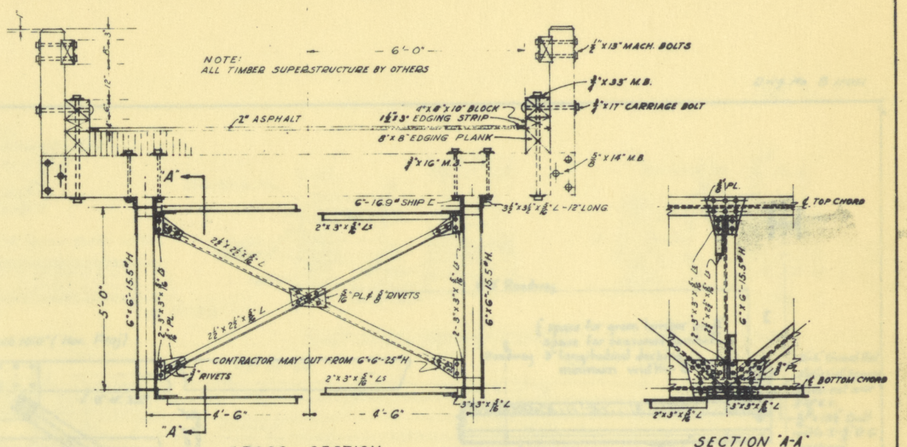
NOTE:
INCREASE LENGTH OF TOP CHORD ⅛" IN 10'-0" FOR CAMBER.



HALF PLAN OF BOTTOM
SCALE ½"=1'-0"

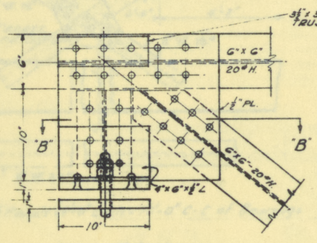


STRESS DIAGRAM - STRESS IN KIPS -

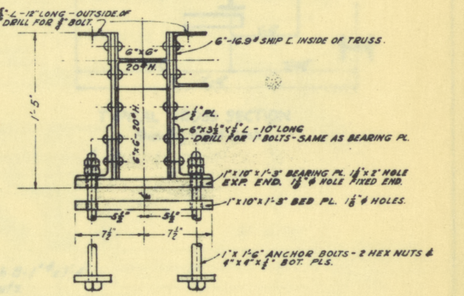


CROSS SECTION
SCALE ½"=1'-0"

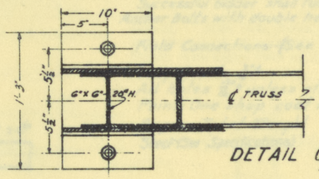
SECTION "A-A"



SIDE ELEVATION



END ELEVATION



DETAIL OF BEARINGS
SCALE 1½"=1'-0"

SECTION "B-B"

LIST OF SUPERSTRUCTURE BOLTS

18 - ⅞" x 3½"	MACH. BOLTS WITH	36 - MAL. C.I. WASHERS		
24 - ⅞" x 17"	CARRIAGE	"	24 - "	" ℄24-1" CUT
36 - ⅞" x 16"	MACH.	"	72 - "	"
54 - ⅞" x 14"	"	"	108 - "	"
36 - ⅞" x 13"	"	"	72 - "	"
6 - ⅞" x 7"	"	"	12 - "	"
8 - 1" x 18"	"	(ANCHORS) - 2 HEX NUTS & 6"x6"x½" BOT. PL'S.		

NOTE: INCREASE EACH LIST OF WASHERS BY 10 %
12 - ⅞" x 9" MACH. BOLTS WITH 24 - M.C.I. WASHERS

NOTE:
ALL MAIN GUSSET PLS. SHALL BE ½" EXCEPT AS NOTED.
RIVETS SHALL BE ⅞".
BRACING SYSTEM TO HAVE ⅜" PLS. WITH ⅞" RIVETS.
HOLES FOR FIELD BOLTS SHALL BE PUNCHED ⅝" ø & REAMED TO SNUG FIT. FOR ⅞" H.S.B. BOLTS.
ENTIRE STRUCTURE SHALL BE SHOP ASSEMBLED FOR INSPECTION & ALL MEMBERS CAREFULLY MATCH-MARKED.

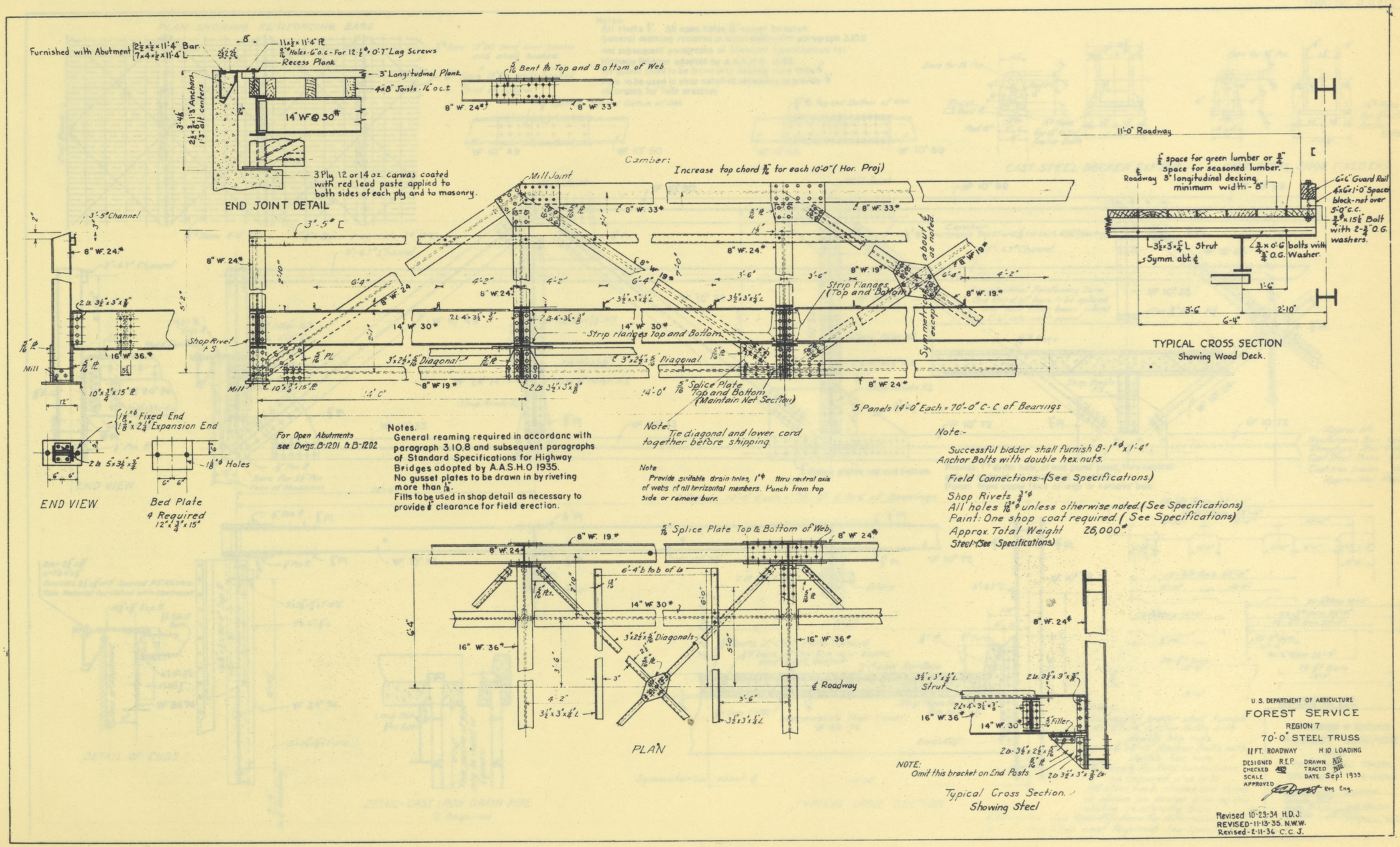
50' DECK TRUSS

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
STANDARD 50' DECK TRUSS
LOADING H-15 ROADWAY 12'
NATIONAL FOREST

SCALES: ½"=1'-0" & 1"=1'
DATE:
DESIGNED J.H.L. | DESIGN CHECKED E.A.M. | DRAWN T.E.A. | TRACED | TRACING CHECKED E.A.M.
APPROVED:
SHEET OF

REGIONAL ENGINEER

Dwg. No. B 11001



U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 7
70'-0" STEEL TRUSS
11 FT. ROADWAY H 10 LOADING
DESIGNED R.E.P. DRAWN
CHECKED TRACED
SCALE DATE Sept 1933
APPROVED Reg Eng.

Revised 10-23-34 H.D.J.
REVISED-11-13-35. N.W.W.
Revised-2-11-36 C.C.J.

DWG No. B 8201

PLAN SHOWING REINFORCING BARS.

Notes:
All rivets ¾". All open holes 13/16" except as noted.
General reaming required in accordance with paragraph 3.10.8 and subsequent paragraphs of Standard Specifications for Highway Bridges adopted by A.A.S.H.O. 1935.
No gusset plate to be drawn in by riveting more than 1/16".
Fills to be used in shop detail as necessary to provide ½" clearance for field erection

CAST STEEL ROCKER EXP END

CAST STEEL SHOE FIXED END

END VIEW

DETAIL OF ENDS

DETAIL-CAST IRON DRAIN PIPE
12 Required

TYPICAL CROSS SECTION

Approx. Wt.
Reinforcing Bars 8000#
Structural Steel 43500
Cast Steel Shoes 1500
Cast Iron Drains 450
Approx. Total 53450#

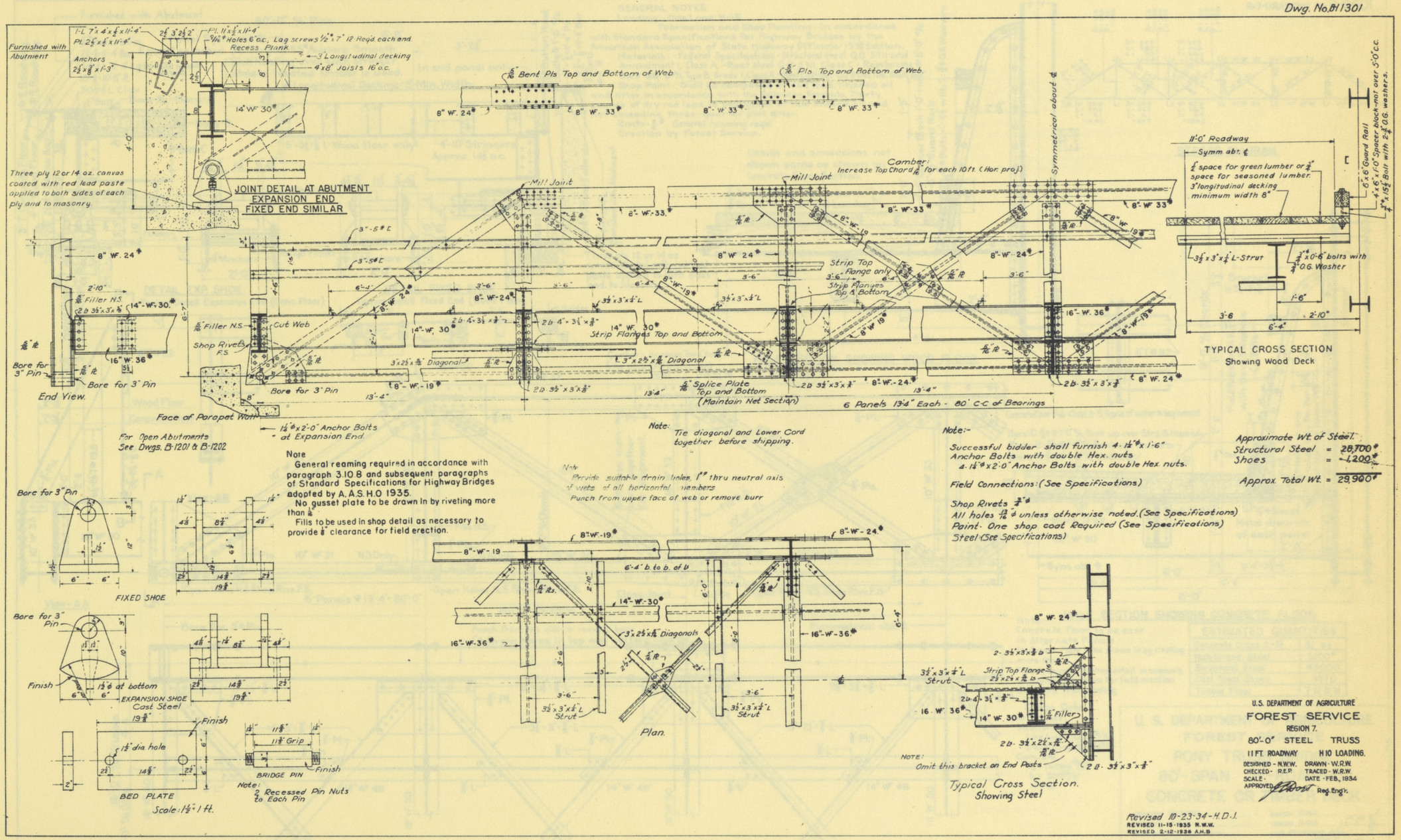
Note-
Successful bidder shall furnish:
4- 1¼"x1'-6" Anchor Bolts with double hex. nuts.
4- 1¼"x2'-0" Anchor Bolts with double hex. nuts.
¾" Rivets for field connections no required plus 10%
All steel work, shapes and forms as shown on design drawing including reinforcing bars.

Alternates: See Specifications for Alternates.
Paint: One shop coat Required. See Specifications.

REV.-FEB.12-1936 A.H.B.
REV.-NOV.6.1935 H.W.W.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DISTRICT 7
70 FT. STEEL TRUSS
18 FT. ROADWAY H 15 LOADING
DESIGNED
CHECKED
SCALE
APPROVED

Dwg. No. B-1301


Furnished with Abutment
Anchors 2 1/2" x 3/8" x 1'-3"
Three ply 12 or 14 oz. canvas coated with red lead paste applied to both sides of each ply and to masonry.
JOINT DETAIL AT ABUTMENT
EXPANSION END
FIXED END SIMILAR
End View.
Face of Parapet Wall
For Open Abutments See Dwgs. B-1201 & B-1202
1 1/2" ø x 2'-0" Anchor Bolts at Expansion End.
3" Longitudinal decking
4"x8" Joists 16" o.c.
Recess Plank
Bent Pls Top and Bottom of Web
Pls Top and Bottom of Web.
Mill Joint
Camber: Increase Top Chord 1/16" for each 10 ft. (Hor. proj.)
Symmetrical about ℄
Strip Top Flange only
Strip Flanges Top & Bottom
Cut Web
Shop Rivets F.S.
Bore for 3" Pin
Splice Plate Top and Bottom (Maintain Net Section)
6 Panels 13'-4" Each - 80' C-C of Bearings
11'-0" Roadway
Symm. about ℄
℄ space for green lumber or 3/4" space for seasoned lumber.
3" longitudinal decking minimum width 8"
6"x6" Guard Rail
4"x6"x1'-0" Spacer block-not over 5'-0" c.c.
3/4" x 10 1/2" Bolt with 2 3/4" O.G. washers.
3 1/2" x 3" x 1/4" L-Strut
3/4" x 0'-6" bolts with 3/4" O.G. Washer
TYPICAL CROSS SECTION
Showing Wood Deck
Note
General reaming required in accordance with paragraph 3.10.8 and subsequent paragraphs of Standard Specifications for Highway Bridges adopted by A.A.S.H.O. 1935.
No gusset plate to be drawn in by riveting more than 1/8".
Fills to be used in shop detail as necessary to provide 1/8" clearance for field erection.
Note: Tie diagonal and Lower Cord together before shipping.
Note: Provide suitable drain holes 1" thru neutral axis of webs of all horizontal members. Punch from upper face of web or remove burr
Note:-
Successful bidder shall furnish 4-1 1/4" ø x 1'-6" Anchor Bolts with double Hex. nuts
4-1 1/4" ø x 2'-0" Anchor Bolts with double Hex. nuts.
Field Connections: (See Specifications)
Shop Rivets 7/8" ø
All holes 1 1/16" ø unless otherwise noted. (See Specifications)
Paint- One shop coat Required (See Specifications)
Steel (See Specifications)
Approximate Wt. of Steel.
Structural Steel = 28,700#
Shoes = 1,200#
Approx. Total Wt. = 29,900#
Bore for 3" Pin
FIXED SHOE
EXPANSION SHOE Cast Steel
Finish
BED PLATE
BRIDGE PIN
Note: 2 Recessed Pin Nuts to Each Pin
Scale: 1 1/2" = 1 ft.
Plan.
Typical Cross Section. Showing Steel
NOTE: Omit this bracket on End Posts
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 7.
80'-0" STEEL TRUSS
11 FT. ROADWAY H 10 LOADING.
DESIGNED - N.W.W. DRAWN - W.R.W.
CHECKED - R.E.P. TRACED - W.R.W.
SCALE - DATE - FEB., 1934
APPROVED Reg. Engr.
Revised 10-23-34 - H.D.J.
REVISED 11-15-1935 N.W.W.
REVISED 2-12-1936 A.H.B.

R-7-DRAWING No B-860!

GENERAL NOTES
Loading:- One Lane H-15
Fabrication and Shop Painting:- In accordance with Standard Specifications for Highway Bridges by the American Association of State Highway Officials - 1935 Edition.
Materials: - Federal Specifications - Structural steel QQ S-711 and Amendment 1, Class A. - Rivet steel QQ S-711, Class C - Reinforcing Bars QQ B-71, Type B, Grade 1, Class A. - Steel Castings QQ S-681, Med. Grade.
Shop Paint:- Shall be composed of red lead, linseed oil and drier, in accordance with the following formula. Thirty pounds of dry red lead to one gallon of raw linseed oil and not exceeding three-quarter pint drier.
Rivets - 7/8". General reaming req'd.
Erection by Forest Service.

Furnished with Abutment
80'-0" c/c Pins
Panel Sym. abt. ℄
6'-8"
3'-2½"
In end panel only
8 - ⅞"ϕ Rivets @ 6" oc Except as noted
2 - 12"×⅜"×11'-4" Bar
1 - 7"×4"×½" L - 11'-4" Lg. Bend to crown of road.
10 - ⅞"×10'-8" Pl.
3 - 3½"×3½"×⅜" L - Clips
1"ϕ Bolts
Bars-B
Bars-A
Bars-D
Bars-C
12" Strip of 55#/square Smooth Roll Roofing over each stringer Unless treated timber is used.
4" Longitudinal Decking - 8" Min. Width
5"×3½"×⅜" L - Wood floor only
4"×10" Stringers Approx. 14½ o.c.
⅝"ϕ Button Head Bolts @ 1'-0" c/c
10" × ½" × 11'-4" Pl.
⅝"ϕ Rivets @ 6" ℄
24 - ⅞"×3" Bars 13 alternate cts.
7'-4½"×½"×11'-4" L Furnished with Abutment
3'-7" Concrete Floor @ ℄ Roadway
4'-0" Wood Floor @ ℄ Roadway
24 - ⅞"×3" Anchor Bars 13 Alt. cts.
Finish
Rough Finish
¾"ϕ Anchors
3"ϕ Pin
Three ply 12 or 14 oz. canvas coated with red lead paste applied to both sides and to masonry.

B
DETAIL EXP. SHOE
Typical Detail Expansion End (Conc. Floor)

DETAIL FIXED SHOE
Typical Detail Fixed End (Wood Floor)
℄ Bridge
2 - ⅞"×3" Bar
1"ϕ Bolts

Details and dimensions not shown same as shown on Concrete Floor Section.
Space for Green Lumber
Space for Seasoned Lumber
4"×6" Spacer Block 1'-0" long @ 5'-0" c/c
6"×6" Guard Rails.
¾"ϕ Bolts 1'-4½" with 2 - ¾"ϕ 0.6 Washers.

HALF SECTION SHOWING WOOD FLOOR

STRESS DIAGRAM

Wood Floor
1'-5"
Concrete Floor
1'-5"
6"[@ 8.2
2'-1⅛"
2'-3⅛"
3'-0"
2'-6"
6½"[@ 19.8
3½"×3½"×⅜" L
10" WF 33
18" WF 50
View-AA
View-BB
View-CC
Camber:- Increase Top Chord ⅛" for each 10'-0" (Horiz. Proj.)
Mill
8"×⅞" Pl.
10" WF 37
10" WF 41
10" WF 21
10" WF 33
⅞" Pls.
½" Pls.
Fills N.S.
N.S. Only
9'-0" c/c Chords
Bolt these members together for shipment.
Fill N.S.
Open Holes N.S. Shop Rivs. F.S.
6 - Panels @ 13'-4" = 80'-0"
Close Joint
80'-0" c/c Pins.
Bore for 3"ϕ Pin.
Punch from top side or remove burr
1"ϕ Drain Holes in top and bottom Chords
Symmetrical abt. ℄
5"×3½"×⅜" L
4"×3"×⅜" L
3½"×3"×⅜" L
3½"×3½"×⅜" L
3"×2½"×⅜" L
⅜" L
⅜" Pl.
14" WF 48
18" WF 50
16'-0" c/c Trusses
7'-0" c/c Strs.
4'-6"

6"[@ 8.2

9'-0" c/c Chords
1'-2"
3½"
Bracket
3½"×3½"×⅜" Pl.
2'-3⅜"
Crimp
Field Bolts for H.R. ¾"ϕ with Bev. Cl Washers
C.I. Fills
7⅛"
4½"
2'-6"
Bar E
1'-6⅛"
¾"ϕ Holes in one Bracket only for Forest Service Name Pls
Concrete Floor Slab - Class A - 1½ gals of water to bag cement
Bars-C - ⅝"ϕ @ 1'-0" c/c Bent up over Strs. & Hooked.
Bars-B - ¾"ϕ @ 1'-0" c/c Bent up in Curb.
Bars-A - ⅝"ϕ @ 1'-0" c/c - Hooked.
Bars-D - ½"ϕ
10" WF 50
1'-6"
4"ϕ Sheet Metal drain ctr. of each panel
2'-8"
Sym. abt. ℄
6'-0"
3'-6
4'-6
8'-0"

HALF SECTION SHOWING CONCRETE FLOOR

Note:-
Concrete floor to be cast in Alternate Panels
No Gusset Plate to be drawn in by riveting more than ⅛"
Fills to be used in shop detail as necessary to provide ⅛" clearance for field erection
Standard H-15 Loading

Design Data
Unit stresses:
Structural Steel
Live Load - 16000#/□"
Dead Load - 24000#/□"
Concrete
f_s = 16000#/□"
f_c = 800#/□"
n = 10

ESTIMATED QUANTITIES	
Concrete Class A-1½	31 cy
Reinforced Steel	5100#
Structural Steel	43000
Cast Steel Shoes	1470
Timber Floor	7-M B M

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
PONY TRUSS BRIDGE
80'-SPAN 11'-ROADWAY
CONCRETE OR TIMBER DECK

DESIGNED R.G.W.S.
CHECKED H.D.J.
RECOMMENDED FOR APPROVAL E.G.M.
DRAWN H.D.J.
TRACED H.D.J. C.C.J.
DATE FEBRUARY 1936.
APPROVED

Rev. 2-10-1936 - Notes C.C.J.

Furnished with Abutment — L 7"x4"x½"x11'-4" 2 2½ 2½" ; R. 2½"x½"x11'-4"

R. 11"x½"x11'-4" 7/16" Holes 6" o.c. and Lag Screws ½" ø x 0'-7" 12 Req'd each end.

Recess plank.

3" Longitudinal decking

4"x8" Joists 16" O.C.

2½"x⅜"x1'-3" Anchors

⅝" Bent Pls. Top and Bottom of Web.

8" WF 24# — 8" WF 33#

⅝" Pls. Top and Bottom of Web

8" WF 32# — 8" WF 33#

14" WF 30#

4'-0"

Three ply 12 or 14 oz. canvas coated with red lead paste applied to both sides of each ply and to masonry.

JOINT DETAIL AT ABUTMENT
EXPANSION END
FIXED END SIMILAR

Reamed Work:
General reaming required in accordance with paragraph 3.10.8 and subsequent paragraphs of Standard Specifications for Highway Bridges adopted by A.A.S.H.O. 1935.

Gusset Plates:
No gusset plate to be drawn in by riveting more than 1/16"

Fills:
Fills to be used in shop detail as necessary to provide 1/8" clearance for field erection.

Camber: Increase Top Chord ⅜" for each 10'-0" (Hor. Proj.)

Mill Joint — Mill Joint

8" WF 33# — 8" WF 24# — 8" WF 19# — 8" WF 24#

3"-5# C — 3"-5# C

6'-4" — 3'-6" — 3'-6" — 6'-4" — 3'-6"

8" WF 24# — 14" WF 30# — 14" WF 30# — Strip Top Flange Only — Strip Flanges Top and Bottom

2 L 4"x3½"x⅜" — 3½"x3"x¼" L — 3½"x3"x¼" L

⅝" Filler N.S. — Cut Web — Shop Rivets F.S. — Strip Flanges Top and Bottom

2'-2" — 2'-2"

3"x2½"x⅜" Diagonal — 3"x2½"x⅜" Diagonal

Bore for 3" Pin — Bore for 3" Pin

8" WF 19# — 2 L 3½"x3"x⅜" — 13'-4" — 13'-4" — 13'-4"

⅝" Splice Plate Top and Bottom (Maintain Net Section)

2 L 3½"x3"x⅜" — 8" WF 24#

7 Panels 13'-4" Each = 93'-4" C-C of Bearings

9'-0" — about ℄ — Symmetrical

2 L 2½"x2½"x⅜" — 16" WF 36# — 8" WF 19# — 2 L 3½"x3"x⅜" — 8" WF 24#

8" WF 24# — 2'-10" — ⅝" Filler N.S. — 2 L 3½"x3"x⅜" — 14" WF 30# — 16" WF 36# — 5½" — 6'-7"

End View

Face of Parapet Wall — 8" — 1¼"ø x 2'-0" Anchor Bolts at Expansion End.

Note:
Tie diagonal and lower Chord together before shipping.

Note:-
Successful bidder shall furnish 4-1¼"ø x 1'-6" Anchor Bolts with double hex nuts.
4-1¼"ø x 2'-0" Anchor Bolts with double Hex Nuts.

Approximate Wt. of Steel.

Structural Steel	=	33,200#
Shoes	=	1,200#
Approx. Total Wt	=	34,400#

Field Connections: (See Specifcations)
Shop Rivets ¾"ø
All holes 13/16"ø unless otherwise noted. (See Specifications)
Paint: One shop coat required (See Specifications)
Steel: (See Specifications)

For Open Abutments see
Dwgs. No. B-1201, B-1202, B-1203 & B-1204
For Wing Abutments see
Dwgs. No. B-8701, B-8702-G, B-8703-G, B-8704-G & B-8705-G

Note
Provide suitable drain holes 1"ø thru neutral axis of webs of all horizontal members
Punch from upper face of web or remove burr

Bore for 3" Pin — 14" — 8" — 18" — 14½" — 6" — 6" — 4½" — 8⅞" — 6½" — 2⅝" — 14⅜" — 19⅛"

FIXED SHOE

Bore for 3" Pin — 3" — 8" — 10" — 1⅝" — 1⅝" — 1¾"ø at bottom — Finish — 6" — 6" — 4½" — 8⅞" — 4½" — 2⅝" — 14⅜" — 19⅛"

EXPANSION SHOE Cast Steel

19⅛" — Finish — 1½" dia. hole — 14⅜" — 6" — 6" — 2" — 2⅝" — 2⅝"

BED PLATE

1¼" — 11⅛" — 11⅜" Grip — 1¼" — Finish

BRIDGE PIN

Note:
2 Recessed Pin Nuts to each Pin

8" WF 19# — 8" WF 24# — 8" WF 24# — 8" WF 24# — 6'-4" b to b of L

2'-10" — 14" WF 30# — 6'-0" — 5'-0"

6'-4" — 16" WF 36# — 3'-6" — 3'-6" — 16" WF 36# — ℄ Bridge

3½"x3"x¼" L Strut — 3½"x3"x¼" L Strut

Plan

8" WF 24# — 3½"x3"x¼" L Strut 2 In each bay — 2-3½"x3"x⅜" Lg — 16" — Strip top flange 2½"x2½"x⅜" Lg — 2 L 4"x3½"x⅜" — 16" WF 36# — 14" WF 30# — ⅝" Filler — 2-3½"x2½"x⅜" Lg — 2-3½"x3"x⅜" Lg

Note:
Omit this bracket on End Posts

Typical Cross Section Showing Steel

11'-0" Clear Roadway

½" Space for Green lumber
¾" Space for Seasoned lumber
3" Longitudinal decking
Minimum width 8"

6"x6" Wheel guard — 4"x6"x10" Spacer Block-not over 5' C.C. — ¾"ø x 15½" Bolt with 2-¾" O.G. Washers. — ¾"ø x 6" Bolt with 1-¾" O.G. Washer.

4"x8" Beam 16' O.C.

3½"x3"x¼" L Strut 2 In each bay

Cross Section of Timber Deck.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 7
93'-4" STEEL TRUSS
11 FT. ROADWAY H 10 LOADING

DESIGNED - R.E.P.	DRAW - W.R.W.
CHECKED - J.C.B.	TRACED - W.R.W.
SCALE - NONE	DATE - MARCH '34
APPROVED	

Reg. Engr.

Revised 8-19-35 A.H.B.
Revised 10-23-34 H.D.J.

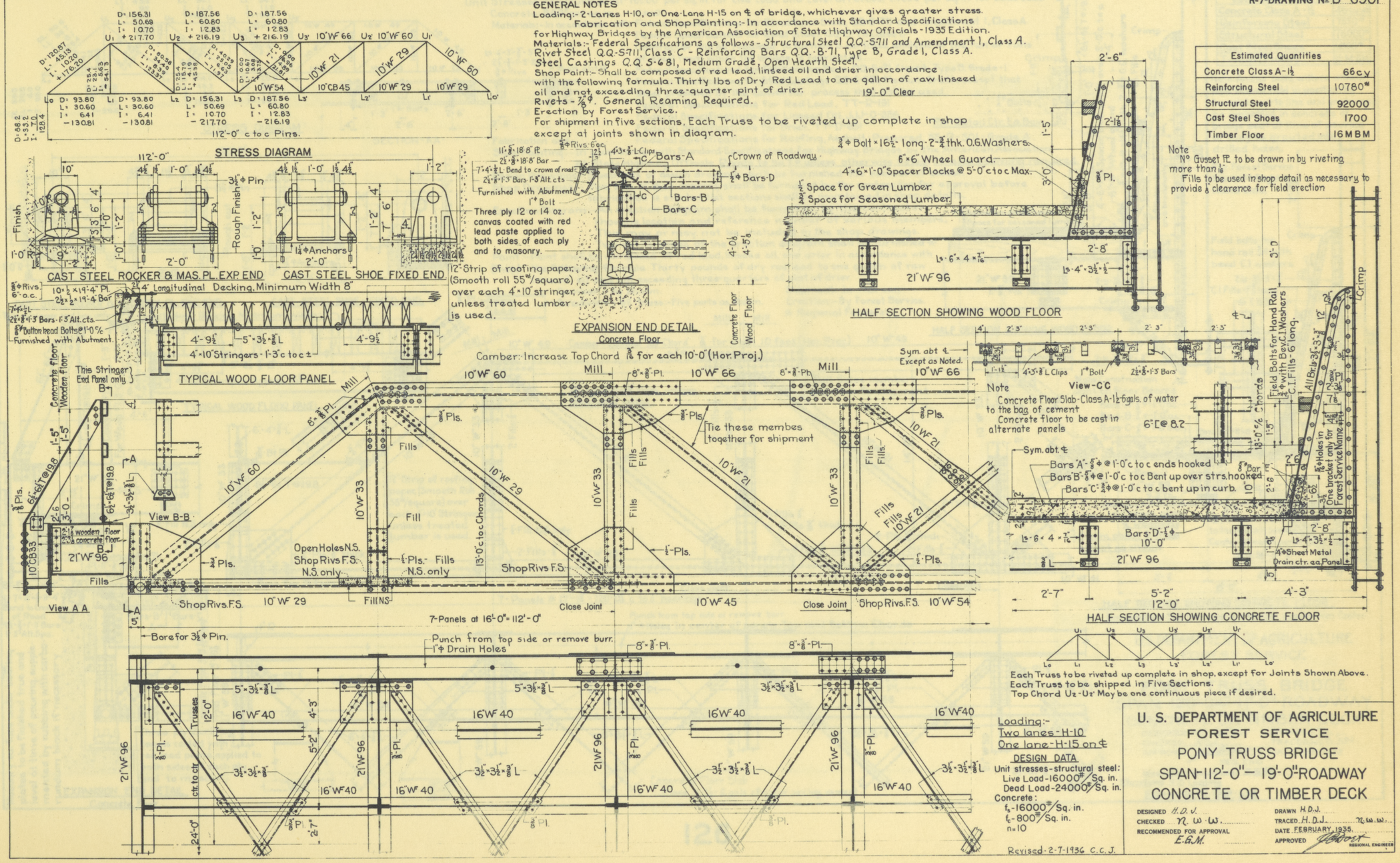
R-7-DRAWING № B-6901

GENERAL NOTES

Loading:- 2-Lanes H-10, or One-Lane H-15 on ℄ of bridge, whichever gives greater stress.
Fabrication and Shop Painting:- In accordance with Standard Specifications for Highway Bridges by the American Association of State Highway Officials - 1935 Edition.
Materials:- Federal Specifications as follows - Structural Steel QQ-S-711 and Amendment 1, Class A.
Rivet Steel QQ-S-711, Class C - Reinforcing Bars QQ-B-71, Type B, Grade 1, Class A.
Steel Castings QQ-S-681, Medium Grade, Open Hearth Steel.
Shop Paint- Shall be composed of red lead, linseed oil and drier in accordance with the following formula. Thirty lbs of Dry Red Lead to one gallon of raw linseed oil and not exceeding three-quarter pint of drier.
Rivets - 7/8". General Reaming Required.
Erection by Forest Service.
For shipment in five sections, Each Truss to be riveted up complete in shop except at joints shown in diagram.

Estimated Quantities	
Concrete Class A-1½	66 c.y.
Reinforcing Steel	10780#
Structural Steel	92000
Cast Steel Shoes	1700
Timber Floor	16 M B.M.

Note
№ Gusset ℄ to be drawn in by riveting more than 1/16
Fills to be used in shop detail as necessary to provide ⅛ clearance for field erection



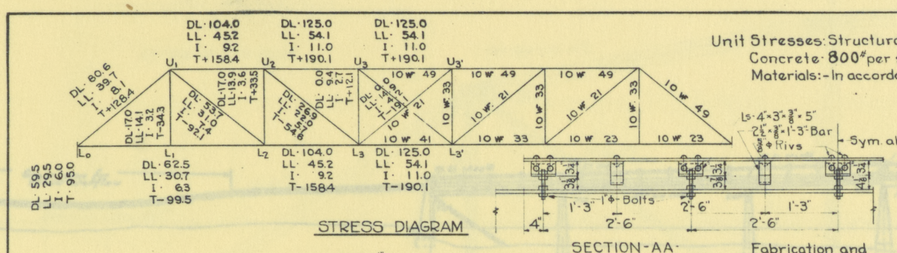
Loading:-
Two lanes - H-10
One lane - H-15 on ℄

DESIGN DATA
Unit stresses - structural steel:
Live Load - 16000# / Sq. in.
Dead Load - 24000# / Sq. in.
Concrete:
f_c - 16000# / Sq. in.
f_s - 800# / Sq. in.
n = 10

Revised - 2-7-1936 C.C.J.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
PONY TRUSS BRIDGE
SPAN - 112'-0" — 19'-0" ROADWAY
CONCRETE OR TIMBER DECK

DESIGNED H.D.J. DRAWN H.D.J.
CHECKED W.W.W. TRACED H.D.J. W.W.W.
RECOMMENDED FOR APPROVAL E.G.M. DATE FEBRUARY 1935
APPROVED REGIONAL ENGINEER



Unit Stresses: Structural Steel - 16000# per sq. in. for Live Load and Lateral Forces, 24000# per sq. in. for Dead Load.
Concrete - 800# per sq. in. n = 10

Materials:- In accordance with Federal Specifications for Structural Steel, QQ-S-711 and Amendment 1, Class A.
Federal Specifications for Rivet Steel, QQ-S-711 Class C
Contractor will be required to furnish a certified analysis of the run or runs of steel from which the bridge is fabricated.
Federal Specifications for Reinforcing Bars, QQ-B-71, Class A, Type B, Grade-1
Federal Specifications for Steel Castings QQ-S-681, Medium Grade, except that steel produced by the convertor process shall not be used.
Federal Specifications for Red Lead, TT-R-191
Federal Specifications for Linseed Oil, JJJ-O-336
Federal Specifications for Drier, TT-D-651
Federal Specifications for Roofing, Asphalt-Prepared, SS-R-501-Grade A.

Fabrication and Shop Painting:- In accordance with Standard Specifications for Highway Bridges by the American Association of State Highway Officials. Rivets to be ¾"ϕ unless otherwise noted. General reaming required.

Design Drawings:- Blueprints of design drawings will be furnished the successful bidder.

Shop Drawings:- Two sets of shop drawing shall be furnished by the contractor for approval before fabrication is started. Net sections shall be maintained in shop details.

Erection Diagram:- An erection diagram shall be furnished by the contractor showing location and reference number of various members. This may or may not be included in the shop drawings. Two extra copies of the erection diagram shall be furnished *

Paint:- (Shop) Paint shall be composed of red lead, linseed oil, and drier in accordance with the following formula: Thirty pounds of dry red lead to one gallon of raw linseed oil and not exceeding three-quarters of pint of drier.

Camber :- As shown.

Subdivision of truss:- Five parts as shown.

Shipment:- In well car.

Erection:- By Forest Service.

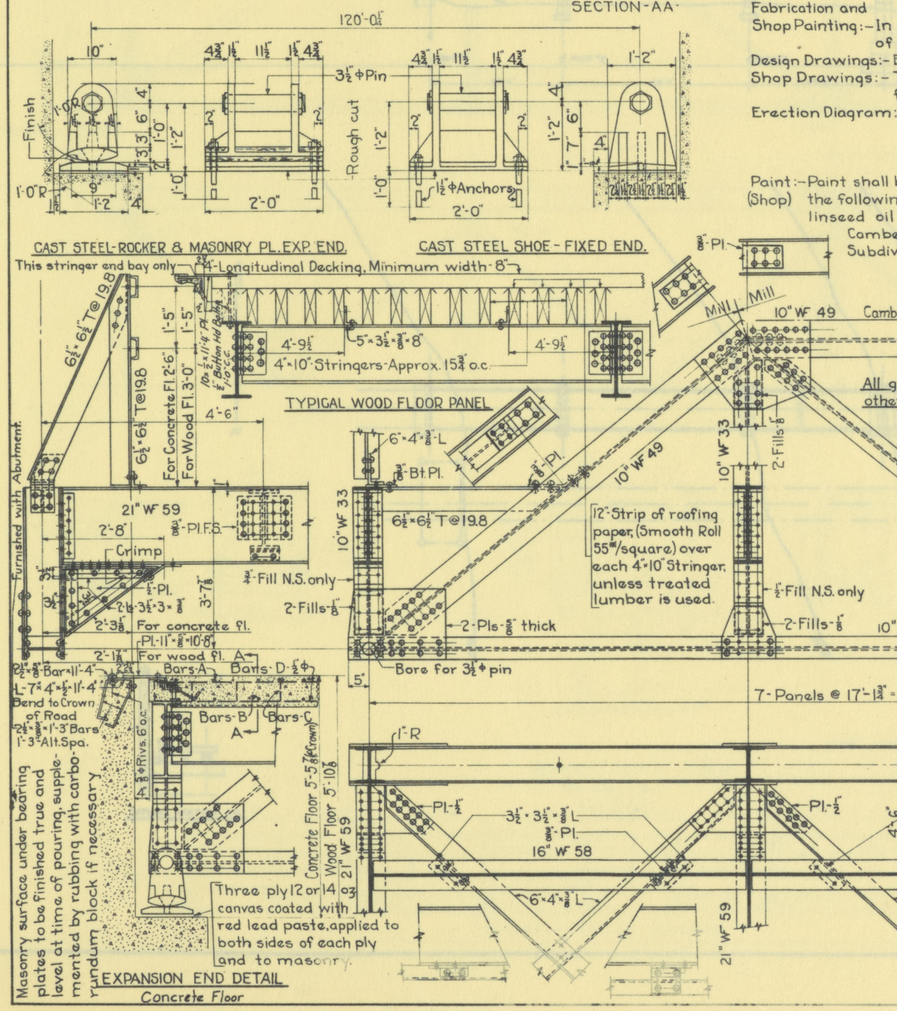
* Regional Forester.

R-7- DWG. NO. B-1901

- Estimated Quantities -	
Concrete Class A - 1½	46 cu yd
Reinforcing Steel	7850#
Structural Steel	76000#
Cast Steel Shoes	1800#
Timber (Floor)	11 M BM

Note: Anchor bolts, with or without pipe sleeves, held in position by templets set to line and grade may be embedded in concrete of bridge seat at time of pouring or may be grouted into drilled holes.

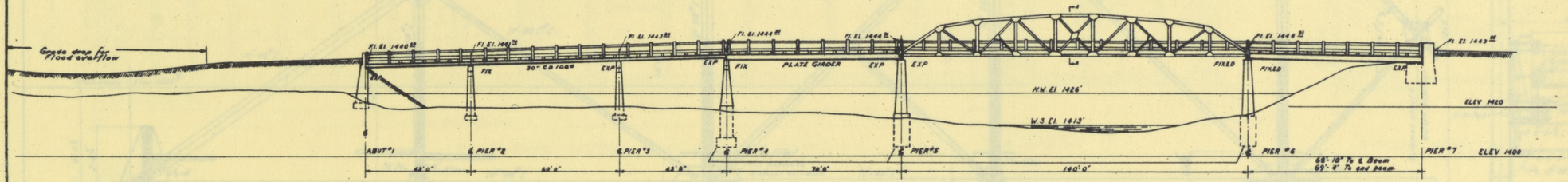
For Forest Service Name Pl. Right Hand Side.



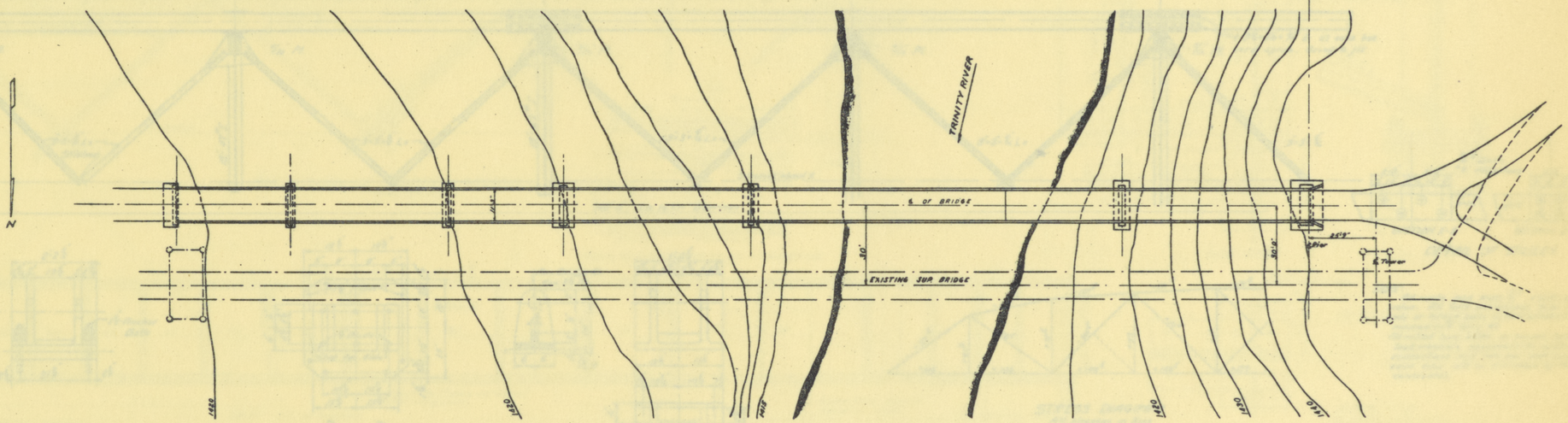
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

PONY TRUSS BRIDGE
SPAN-120'-0¼"-11'-0"-ROADWAY
CONCRETE OR TIMBER DECK

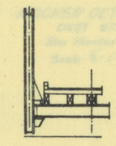
DESIGNED O.W.W. DRAWN L.T.S.
CHECKED H.D.J. TRACED L.T.S. H.D.J
APPROVED _____ DATE-JAN., 1935
REG. ENG.
RECOMMENDED FOR APPROVAL E.G.M.
Standard H15 Loading
Revised Apr. 15, 1935 - L.T.S.
Revised Feb. 16, 1936 - L.T.S.



PROFILE ON ℄ LOOKING UPSTREAM
SCALE 1"=20'



PLOT PLAN
SCALE 1"=20'



TYPICAL SECTION A-A

PLOT PLAN AND PROFILE

REVISIONS			
NO.	DATE	BY	CHECK
1	6 18 36	RAC	EAM

	BY	DATE
ORIGINAL		
DESIGNED	JRL-EAM NWM	5-21-36
DRAWN	RS	5-26-36
TRACED	TLJ-RAC	5-29-36
CHECKED	NWM	5-29-36

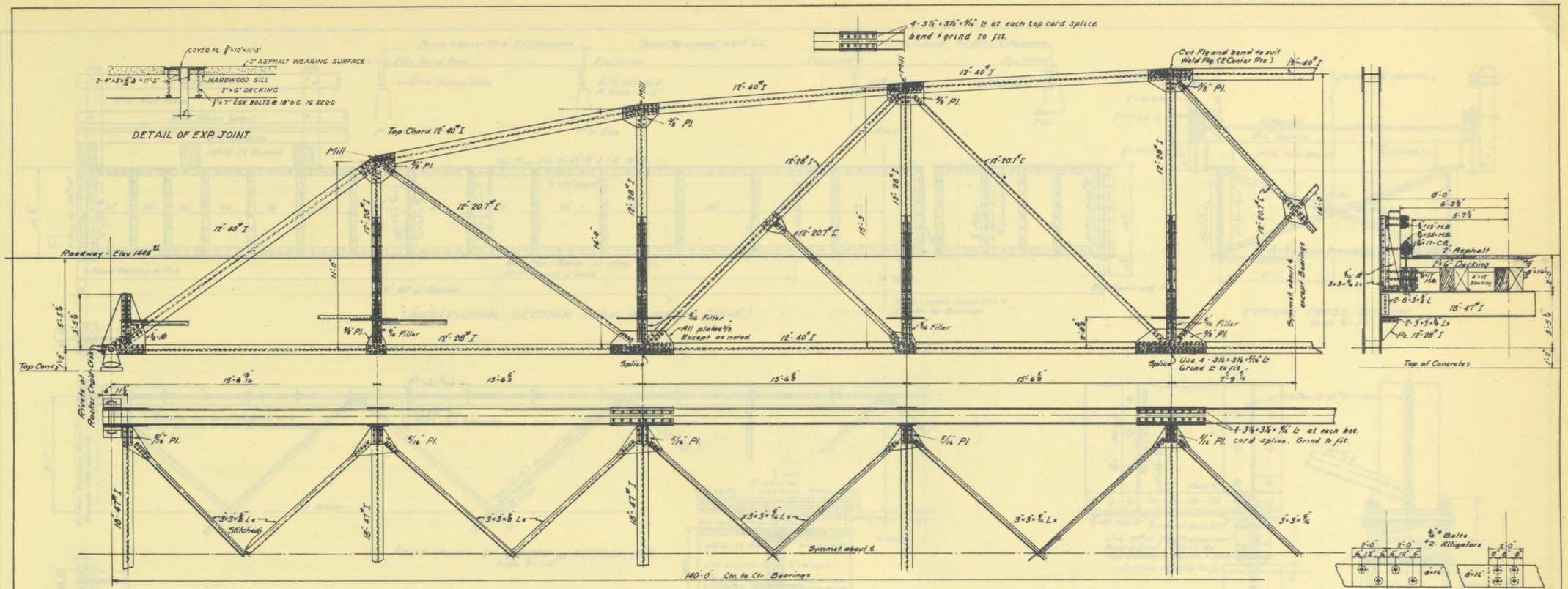
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER REGIONAL ENGINEER

JUNCTION CITY BRIDGE

LOADING H-15 ROADWAY 12'
SCALE NATIONAL FOREST

RECOMMENDED FOR APPROVAL DATE 6-3-36
John R. Lawrence
CIVIL ENGINEER

APPROVED DATE 6-3-36
E.W. Kramer
ACTING REGIONAL ENGINEER



TRINITY COUNTY

APPROVED FOR COUNTY BOARD OF SUPERVISORS

CHAIRMAN

REVISIONS			
NO.	DATE	BY	CHECK
1	9 18 36	R.A.C	E.A.M

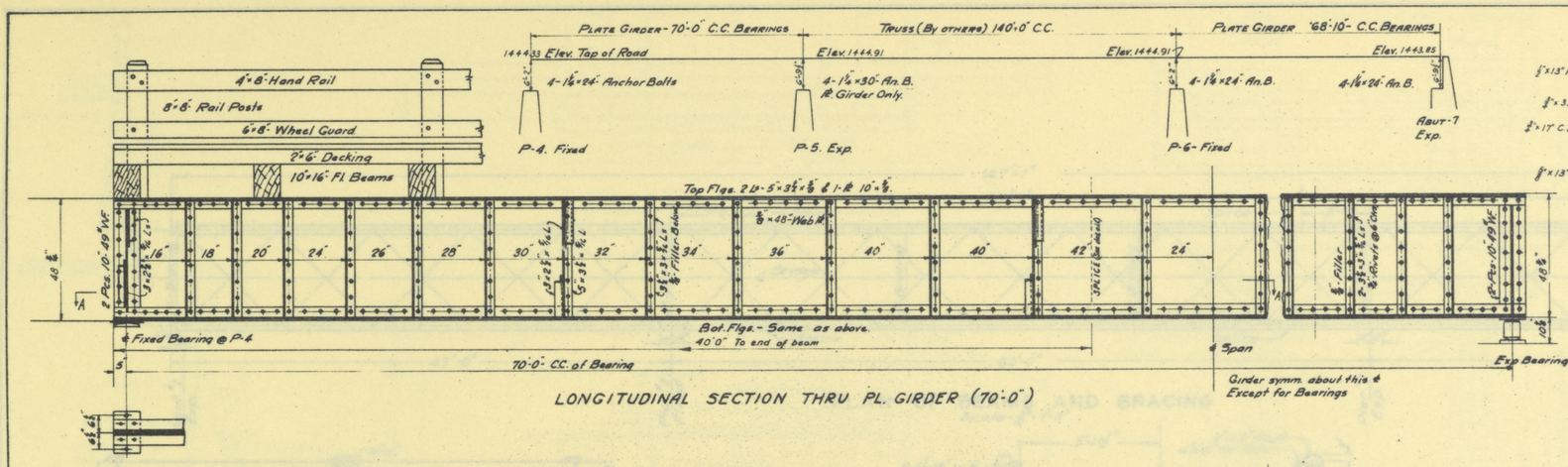
ORIGINAL	BY	DATE
DESIGNED	J.H.L. E.R.H.	5/22/36
DRAWN	J.H.W.	5/24/36
TRACED	J.H.W.	5/24/36
CHECKED	E.R.H.-N.W.P.	5/31/36

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE — E.W. KRAMER - REGIONAL ENGINEER

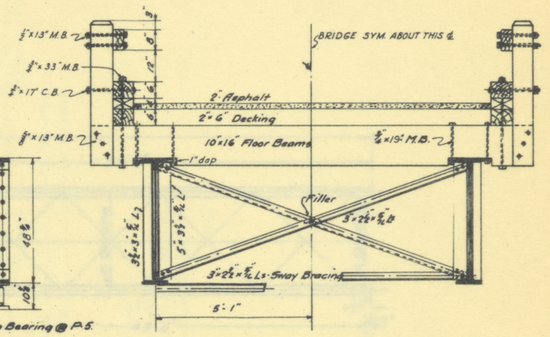
JUNCTION CITY BRIDGE
140 FT. TRUSS
LOADING H-15 ROADWAY 12'
SCALE: ¾" and ¾"=1'-0" - 1"=10'-0" TRINITY NATIONAL FOREST

RECOMMENDED FOR APPROVAL John R. Laurance CIVIL ENGINEER DATE-May-29-1936

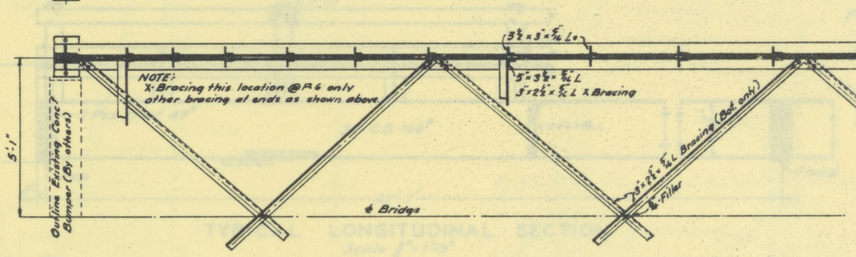
APPROVED DATE 5-29-36 ACTING REGIONAL ENGINEER



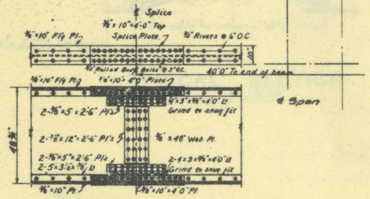
LONGITUDINAL SECTION THRU PL. GIRDER (70'-0")



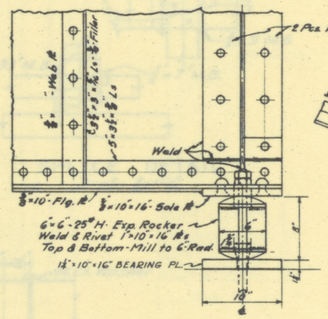
TYPICAL CROSS SECTION
Scale ½"-1'-0"



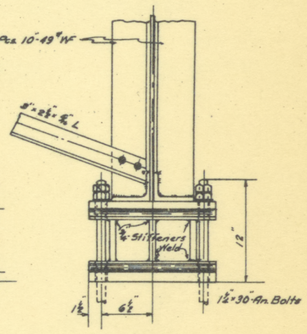
PART PLAN OF GIRDER @ SECTION A-A.
Scale ½"-1'-0"



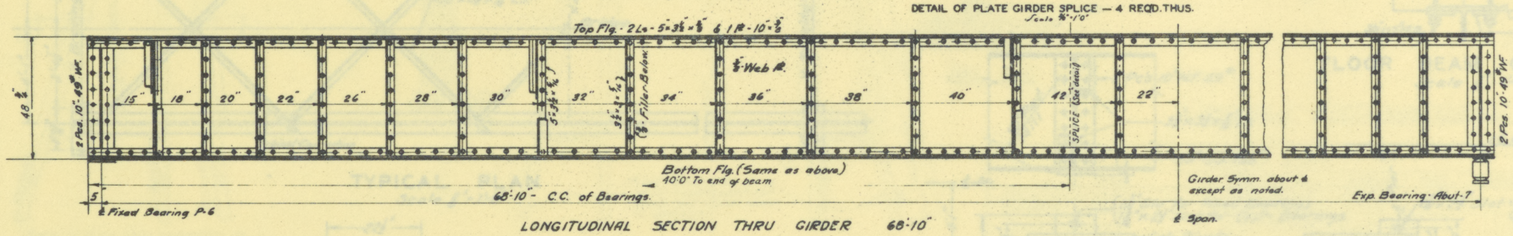
DETAIL OF PLATE GIRDER SPLICE — 4 REQ'D. THUS.
Scale ½"-1'-0"



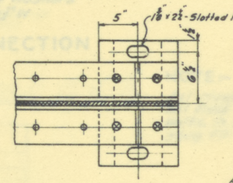
SIDE VIEW



END VIEW.



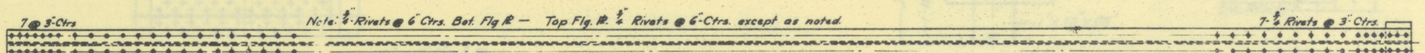
LONGITUDINAL SECTION THRU GIRDER 68'-10"



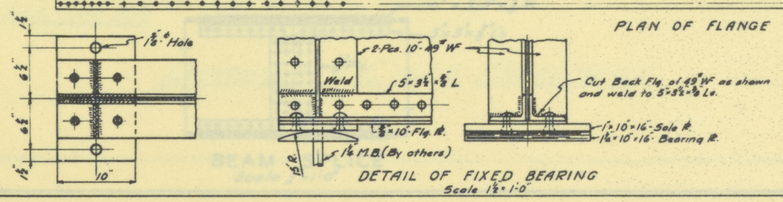
DETAIL OF EXPANSION BEARING
Scale 1½"-1'-0"

PLAN

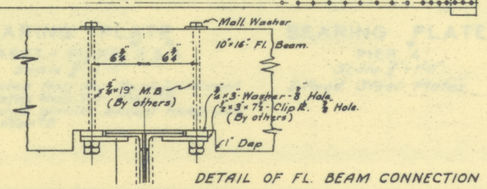
GENERAL NOTES:
ALL RIVETS SHALL BE ⅞".
FIELD CONNECTIONS SHALL BE SUB-PUNCHED ¾" ℄ REAMED TO SNUG FIT FOR ⅞" R.B. BOLTS, WITH MEMBERS IN PLACE. FILLERS @ ALL WEB STIFFENERS.
ALL ANCHOR AND LEACH BOLTS BY OTHERS.
RIVETED ℄ WELDED SURFACES IN CONTACT NOT PAINTED.



PLAN OF FLANGE COVER PLATE.



DETAIL OF FIXED BEARING
Scale 1½"-1'-0"



DETAIL OF FL. BEAM CONNECTION

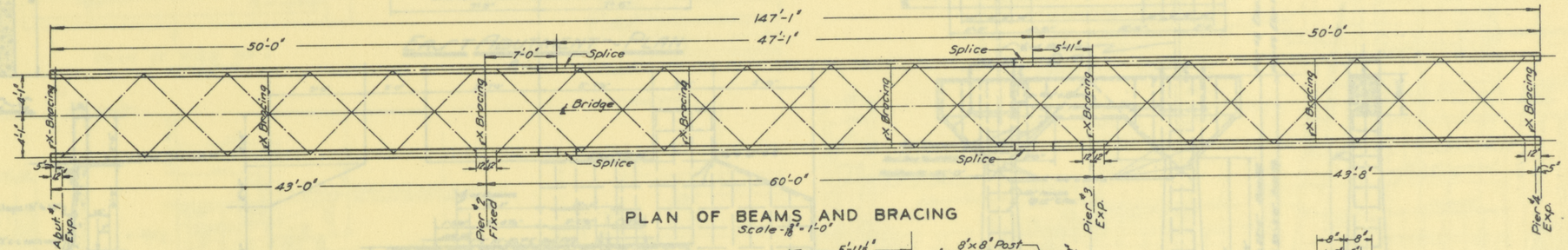
REVISIONS			
NO	DATE	BY	CHECK
1	8-17-36	R.A.C.	E.A.M.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER - REGIONAL ENGINEER

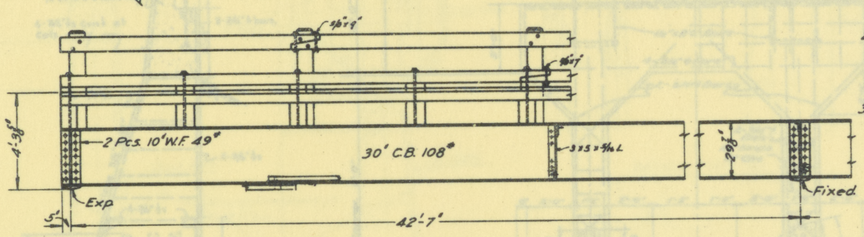
JUNCTION CITY BR.
70' PLATE GIRDERS
LOADING - H-15 ROADWAY 12'
SCALE 1/2" = 1'& 1-1/2" = 1'0" NATIONAL FOREST

	BY	DATE
ORIGINAL		
DESIGNED	J.H.L. K.R.W.	N.W.M. E.A.M. 8-20-36
DRAWN	E.A.M.	5-28-36
TRACED	J.H.W.	8-28-36
CHECKED	N.W.M. E.A.M.	8-1-36

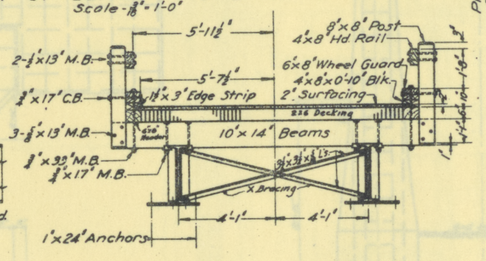
RECOMMENDED FOR APPROVAL DATE 8-3-36
John H. Lawrence CIVIL ENGINEER
APPROVED DATE 8-3-36
ACTING REGIONAL ENGINEER



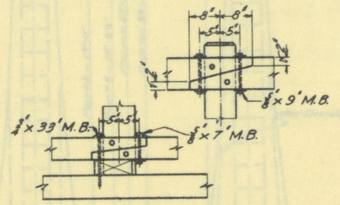
PLAN OF BEAMS AND BRACING
Scale 1/8"-1'-0"



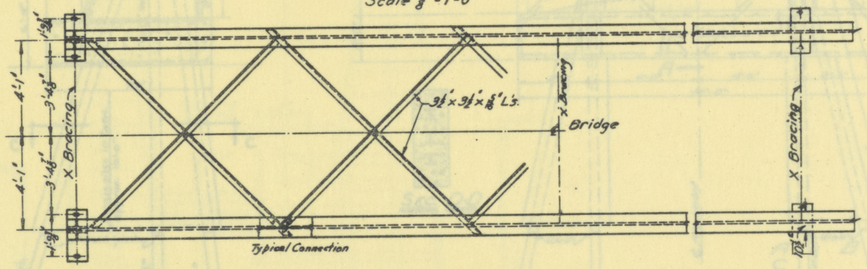
TYPICAL LONGITUDINAL SECTION
Scale 3/8"-1'-0"



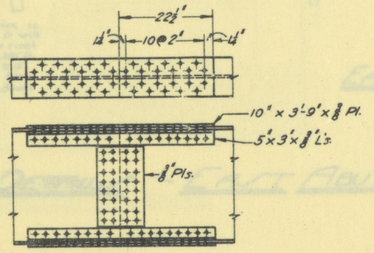
TYPICAL SECTION
Scale 3/8"-1'-0"



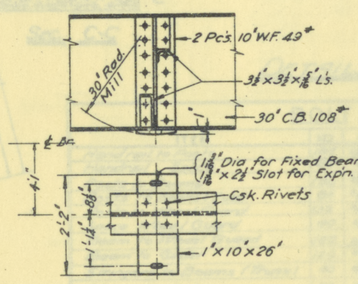
SPLICE DETAIL
Scale 3/4"-1'-0"



TYPICAL PLAN
Scale 3/8"-1'-0"

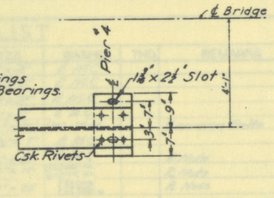


BEAM SPLICE
Scale 3/4"-1'-0"

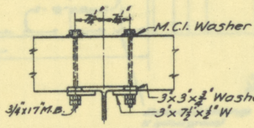


BEARING PLATE
EAST ABUT.- PIERS #2 & 3
Scale 3/8"-1'-0"

2 Steel Plates thus for East Abutment.
2 Bronze Plates thus for Pier #3.
2 Steel Plates similar except holes will be 1⅛" ϕ for Pier #2.



BEARING PLATE
PIER #4
Scale 3/8"-1'-0"
2 Reqd. Steel Plates.



FLOOR BEAM CONNECTION
Scale 3/4"-1'-0"

NOTE:-
All rivets and bolts ⅞" ϕ unless otherwise noted.
All field connections to be rolled body or turned bolts, in sub-punched 1⅛" ϕ holes, reamed to ⅞" snug fit.

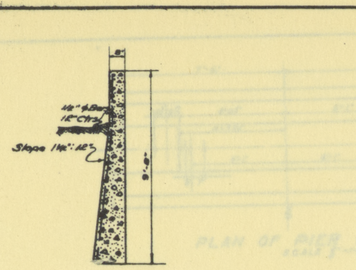
REVISIONS			
NO	DATE	BY	CHECK'D

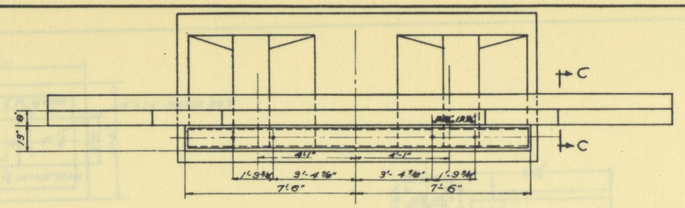
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE. E.W. KRAMER—REGIONAL ENGINEER.

JUNCTION CITY BRIDGE
LOADING H-15 ROADWAY 12'
SCALE 3/16"-3/8"-1/2"-1'-0" TRINITY NATIONAL FOREST

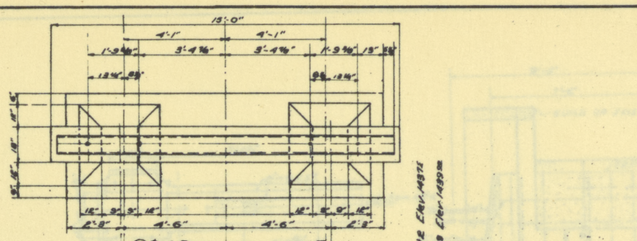
ORIGINAL		
DESIGNED	J.W.L. E.R.M.	5-21-36
DRAWN	N.W.M.	5-28-36
TRACED	H.S.	5-28-36
CHECKED	E.R.M. N.W.M.	5-29-36

RECOMMENDED FOR APPROVAL. DATE 5-29-36
CIVIL ENGINEER
APPROVED DATE 5-29-36
ACTING REGIONAL ENGINEER

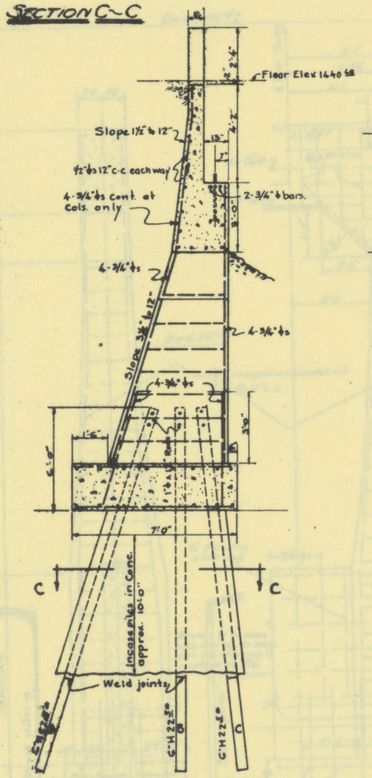




EAST ABUTMENT ~ PLAN

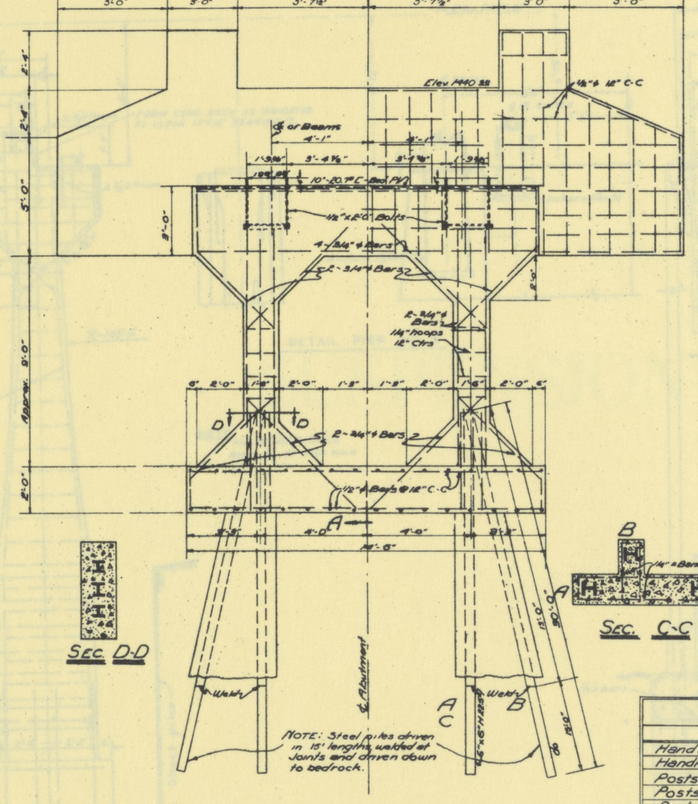


SECTION C~C



NOTE: If at any time excavation is carried below pile cap it will be necessary to weld or rivet steel braces of 4"x4"x⅜" angles around the 3 piles at 5'-0" vertical intervals as the excavation is carried down

SECTION A-A


Elev 1440.58
⅝" or Beams
4'-1"
10"-20.7# C. Bar PVI
1⅛"x 2'-0" Bolts
4-¾"ϕ Bars
2-¾"ϕ Bars
2-¾"ϕ Bars
1¼" Hoops 12" C.t.s.
12"ϕ Bolts @ 18" C-C
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A
B
B
C
C
D
D
Weld
Weld
E. Abutment
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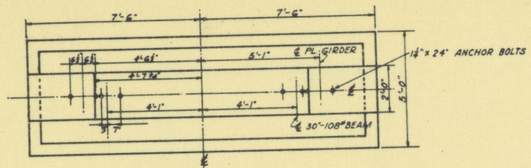
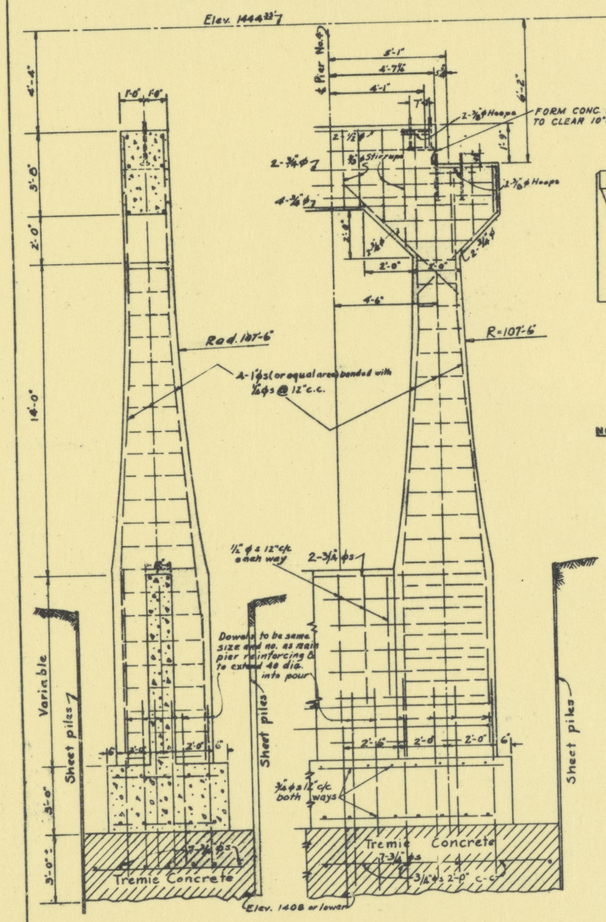
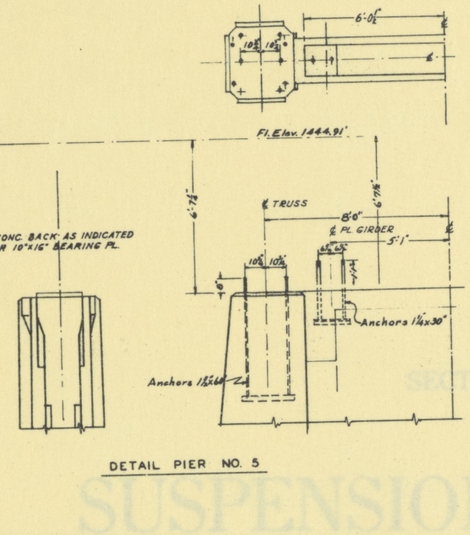


PLAN OF PIER No. 4
SCALE 3/8"=1'-0"

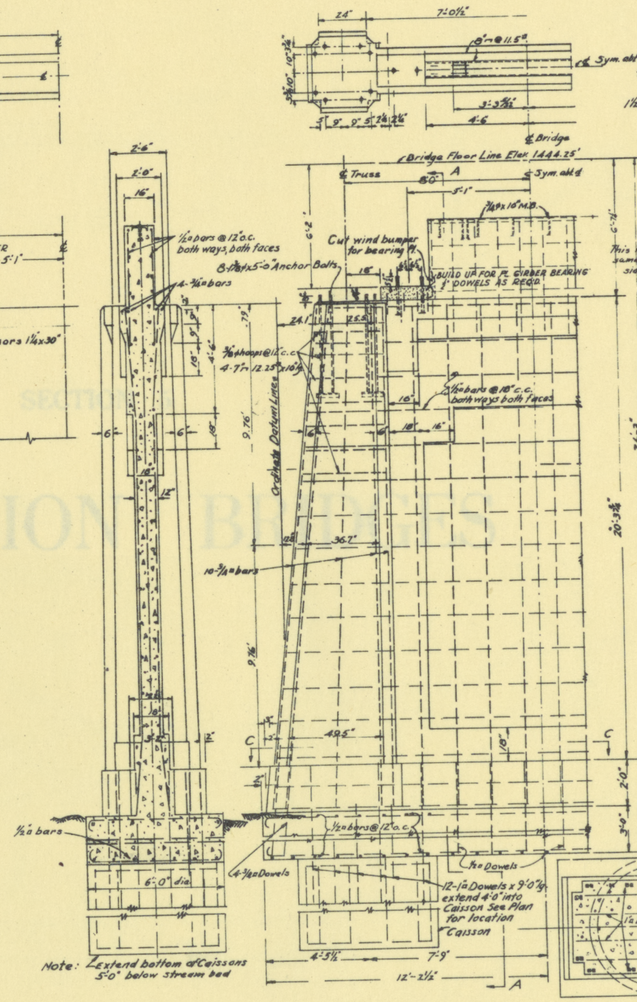


DETAIL PIER NO. 4 JUNCTION CITY BRIDGE



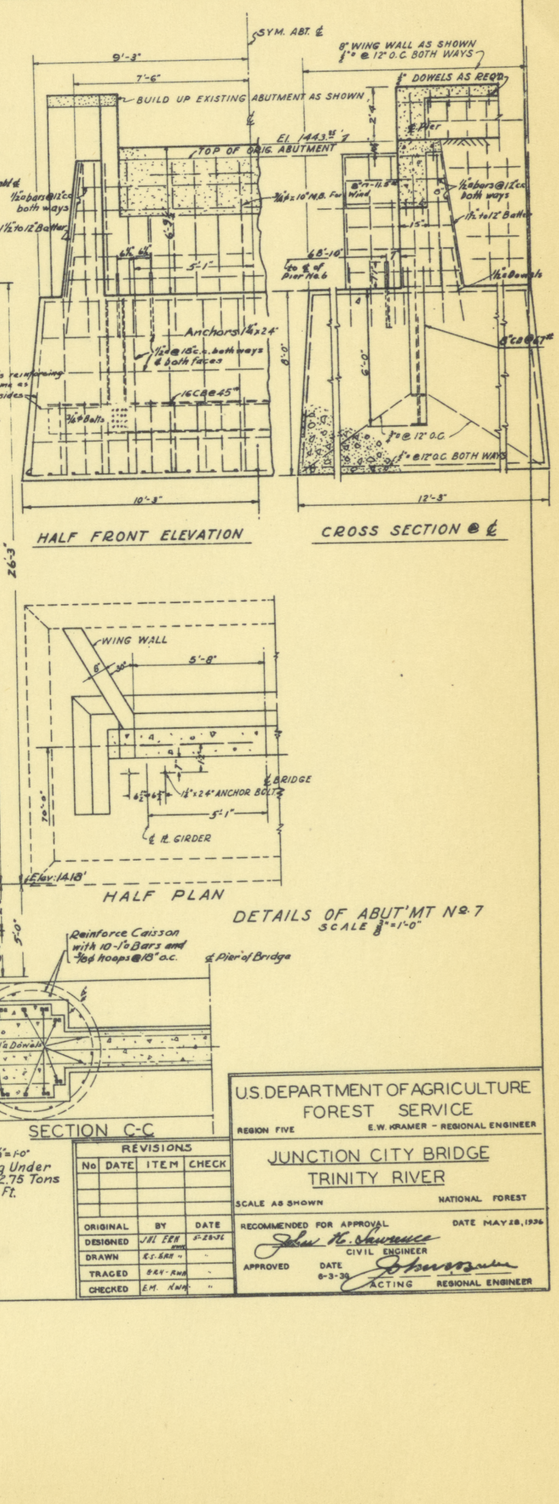
DETAIL PIER NO. 5

NOTE ALL OTHER DETAILS SIMILAR TO PIER No.6



HALF ELEVATION
DETAILS OF PIER NO.6

Scale: 3/8"=1'-0"
Bearing Under Piers 2.75 Tons per □ Ft.



DETAILS OF ABUT'MT No. 7
SCALE 3/8"=1'-0"

REVISIONS			
No	DATE	ITEM	CHECK

ORIGINAL	BY	DATE
DESIGNED	J.E.L. EBB	5-28-36
DRAWN	K.S. SAR	"
TRACED	B.E.Y. RWB	"
CHECKED	E.M. RWB	"

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER - REGIONAL ENGINEER

JUNCTION CITY BRIDGE
TRINITY RIVER

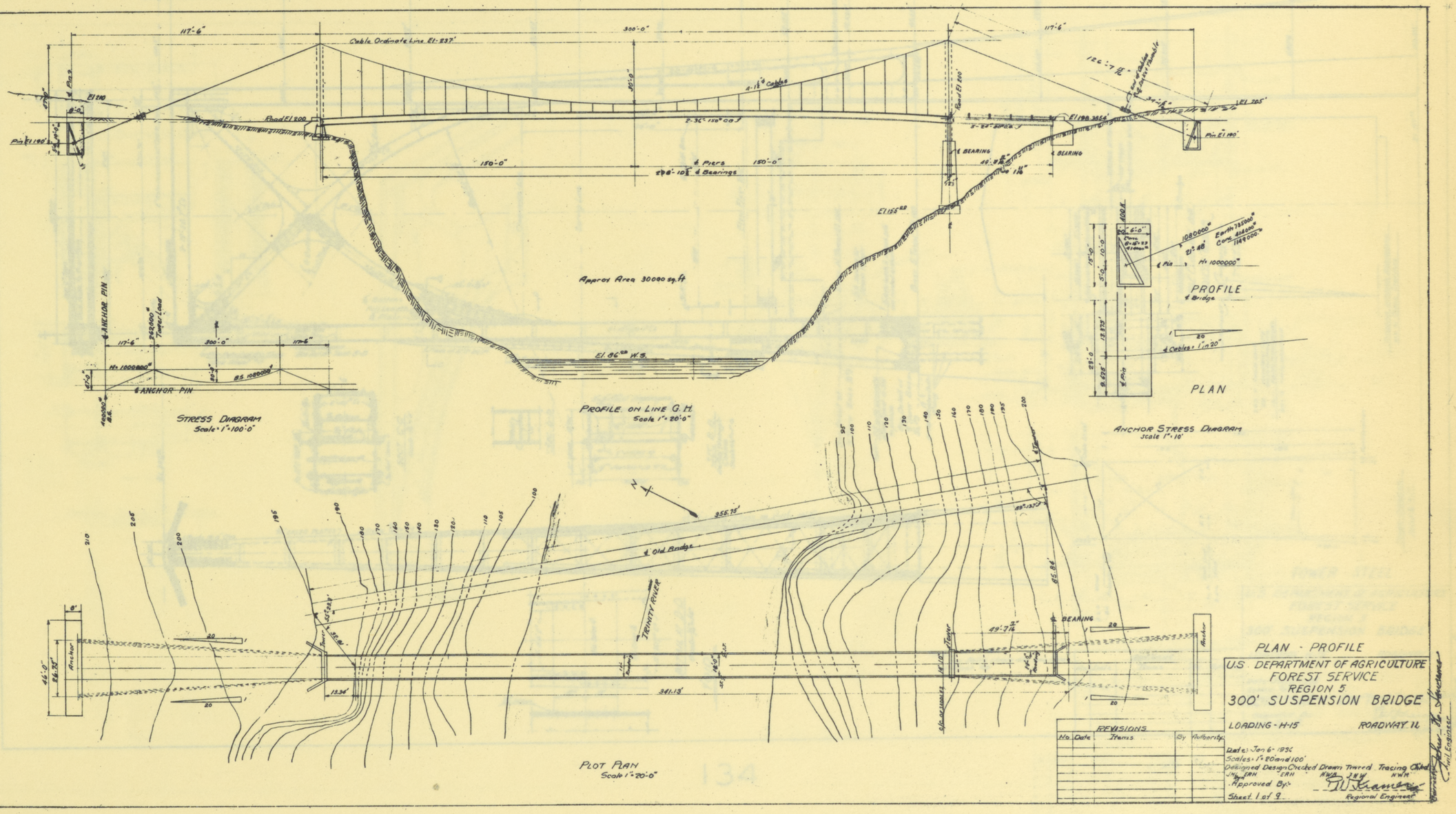
SCALE AS SHOWN NATIONAL FOREST

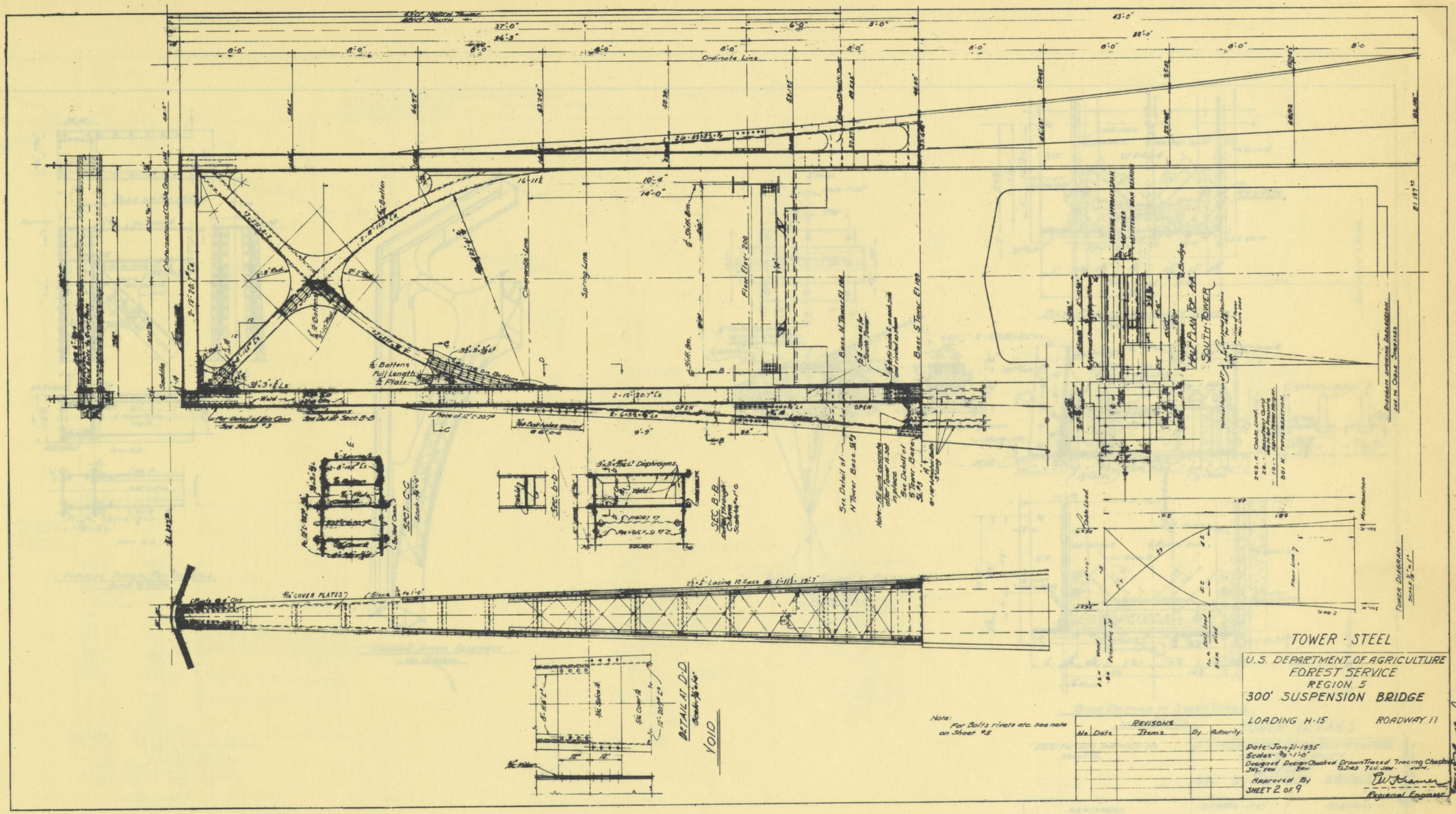
RECOMMENDED FOR APPROVAL DATE MAY 28, 1936
John H. Lawrence
CIVIL ENGINEER

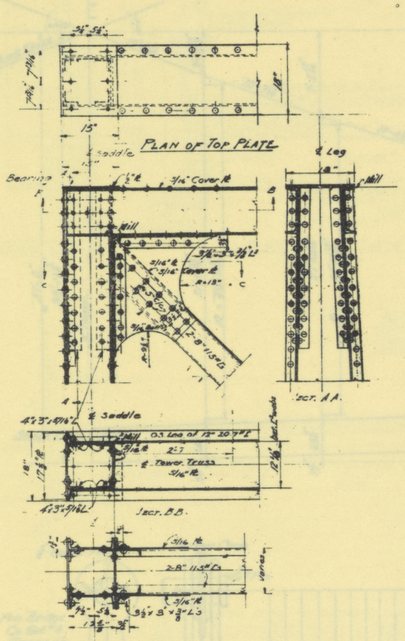
APPROVED DATE 6-3-36
ACTING REGIONAL ENGINEER

SECTION 5

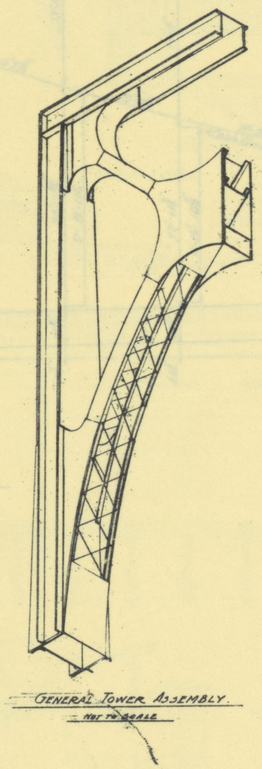
SUSPENSION BRIDGES


117'-6"
300'-0"
Cable Ordinate Line El. 237'
105'-0"
2-1⅝" Cables
El 210
Road El 200
2-35° 150° 00"
Road El 200
El 198.365'
2-24° 30° 00"
117'-6"
12'-7⅞"
Pin El 190'
Pin El 190'
150'-0"
℄ Piers 150'-0"
298'-10⅝" ℄ Bearings
℄ BEARING
BEARING
El 155.83
Approx Area 30000 sq. ft
El. 86.58 W.S.
℄ ANCHOR PIN
℄ ANCHOR PIN
117'-6"
300'-0"
117'-6"
H= 1000000"
BS 1080000"
Taper Load
STRESS DIAGRAM
Scale 1"=100'-0"
PROFILE ON LINE G.H.
Scale 1"=20'-0"
1080000"
Earth 743000"
Conc. 814000"
1149000"
H= 1000000"
℄ Pier
PROFILE
℄ Bridge
℄ Cables = 1 in 20"
PLAN
ANCHOR STRESS DIAGRAM
Scale 1"=10'
N
356.75'
℄ Old Bridge
TRINITY RIVER
341.18'
℄ BEARING
Anchor
Anchor
20
PLOT PLAN
Scale 1"=20'-0"
PLAN - PROFILE
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
300' SUSPENSION BRIDGE
LOADING - H-15
ROADWAY 11'
REVISIONS
No. Date Items By Authority
Date: Jan 6- 1936
Scales: 1"=10 and 100'
Designed Design Checked Drawn Traced Tracing Checked
Approved By:
Sheet 1 of 9
Regional Engineer
Forest Engineer

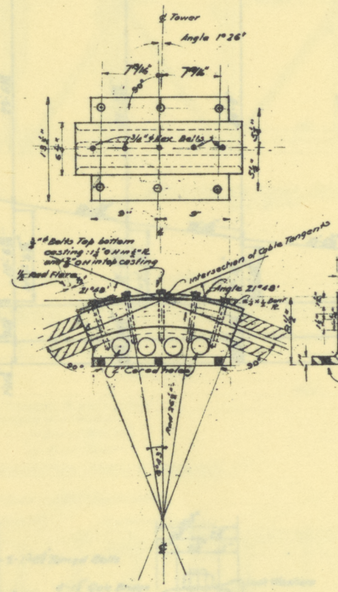

Ordinate Line
Clearance Line
Spring Line
Float Elev. 200
Base N. Tower El. 196
Base S. Tower El. 189
OPEN
Weld
Lacing on Bottom
Stiff Bm.
Saddle
Pedestal at Cable Bend
Cable Load
Wind
Dead Load
Wind
Tower Diagram
SECT. C-C
SEC. D-D
SEC. B-B
DETAIL AT D.D
VOID
TOWER - STEEL
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
300' SUSPENSION BRIDGE
LOADING H-15
ROADWAY 17
REVISIONS
No. Date Items By Authority
Date: Jan 21-1935
Scales- 3/8"-1'-0"
Designed Design Checked Drawn Traced Tracing Checked
JWL Sen BRH TLU Jaw
Approved By
SHEET 2 of 9
Regional Engineer



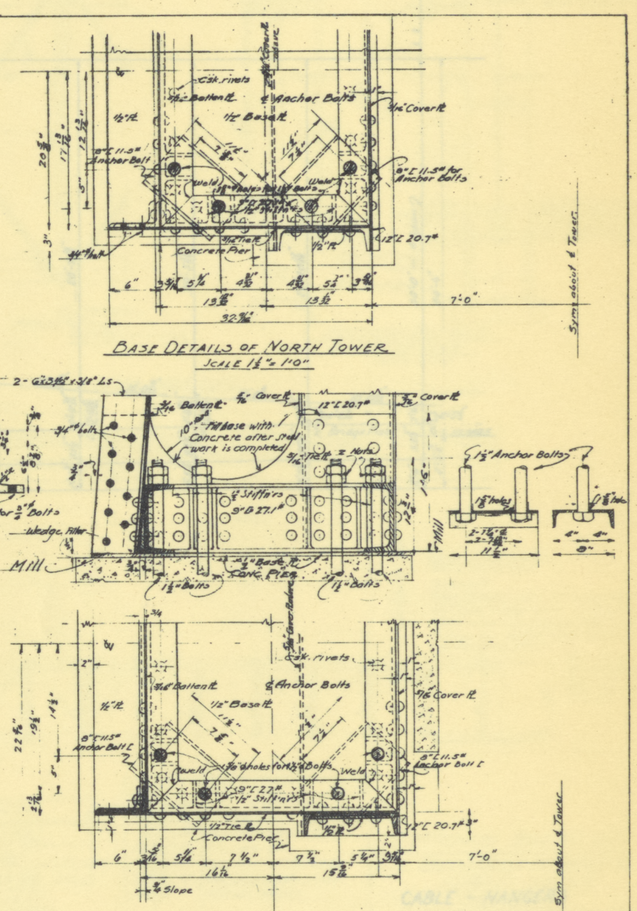
TYPICAL TOWER TOP DETAILS
SCALE 3/4" = 1'0



GENERAL TOWER ASSEMBLY
NOT TO SCALE



TYPICAL SADDLE DETAILS
(Cast Steel)
SCALE 1½" = 1'



BASE DETAILS OF NORTH TOWER
SCALE 1½" = 1'0"

BASE DETAILS OF SOUTH TOWER
SCALE 1½" = 1'0

TOWER DETAILS

*NOTE: For bolts and rivets see Sheet #5.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
300' SUSPENSION BRIDGE

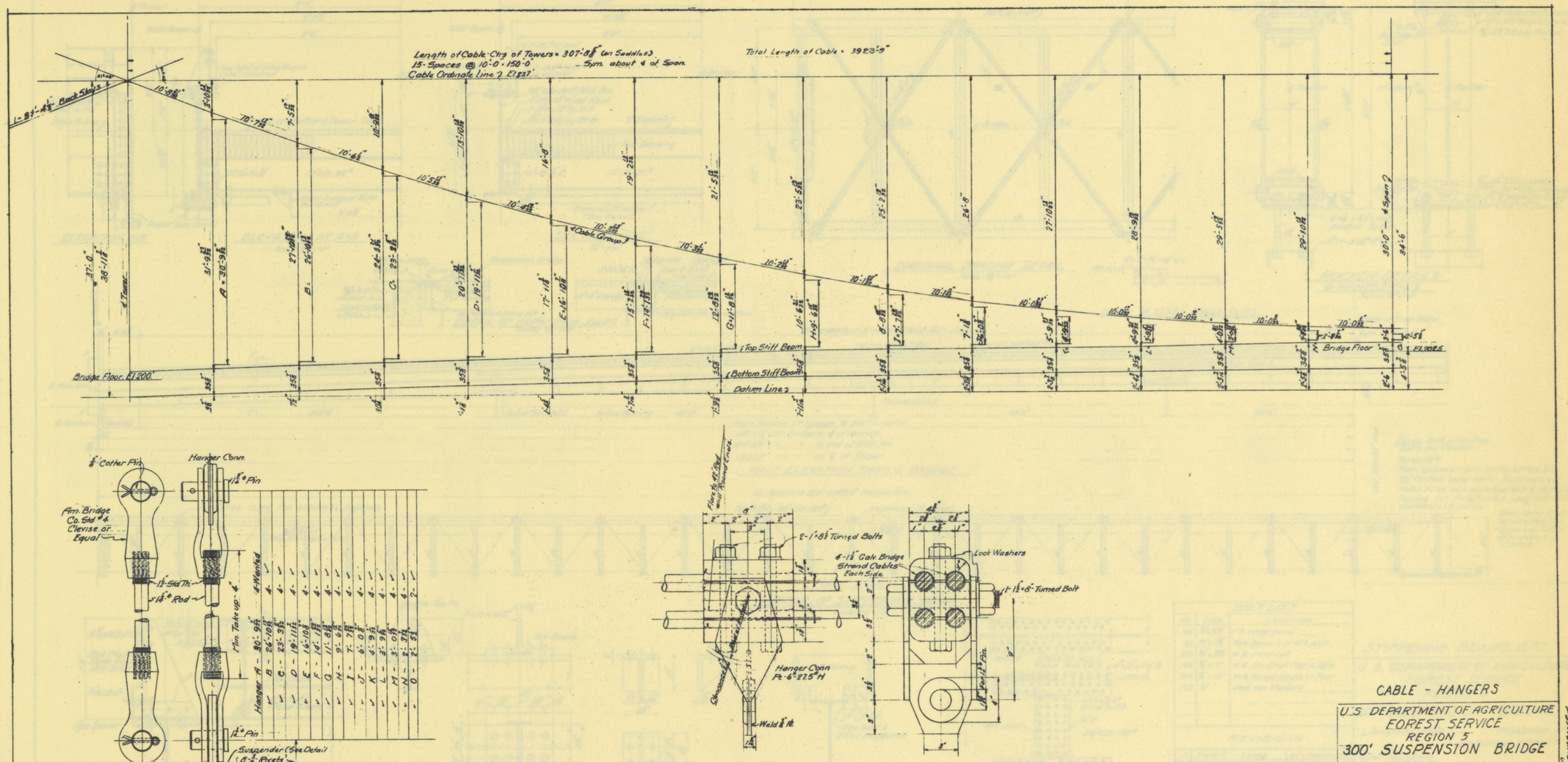
LOADING - H-15 ROADWAY 11'

REVISIONS				
NO	DATE	ITEM	BY	APPROVED

DATE: JAN 6-1936
SCALES: 3/4" & 1½" = 1'0"
DESIGNED J.N.L. E.R.H. H.M.H. | DESIGN CHECKED E.R.H. | DRAWN T.E.J. | TRACED N.V.B. | TRACING CH'KD A.W.M.
APPROVED
SHEET 3 OF 9

REGIONAL ENGINEER

CORRECT John N. Lewis
CIVIL ENGINEER



CABLE - HANGERS

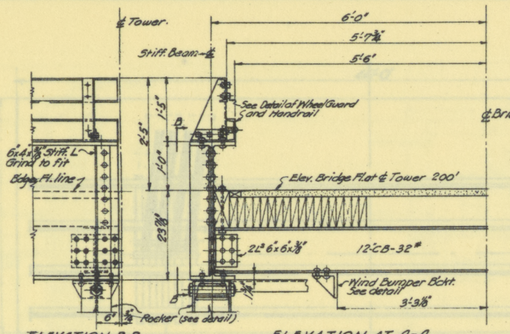
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
300' SUSPENSION BRIDGE

LOADING H-15 ROADWAY 11'
NATIONAL FOREST

Date: Jan 6 1936
Scales 3/16 & 3" = 1'-0"
Designed JHL Design Chkd JAH Drawn JHW Traced JHW Tracing Chkd HWA
Approved By _____ Regional Engineer
SHEET NO 4 OF 9

REVISIONS				
No.	Date	Item	By	Authority

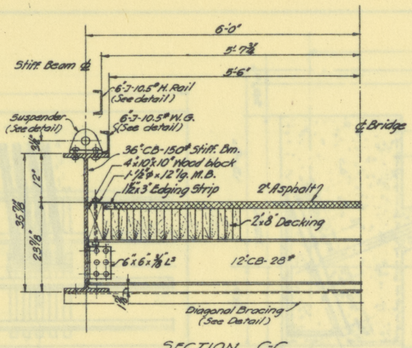
John H. Lawrence



ELEVATION B-B

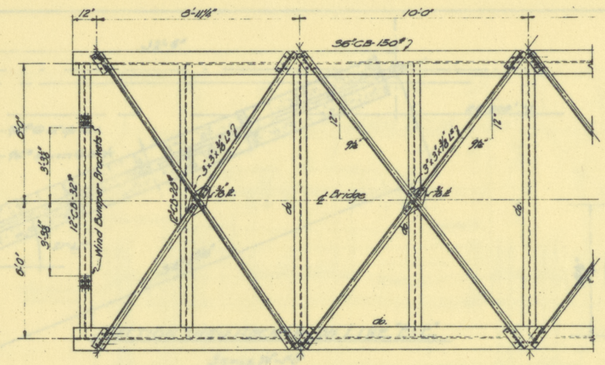
ELEVATION AT A-A

Scale: ⅜"=1'-0"



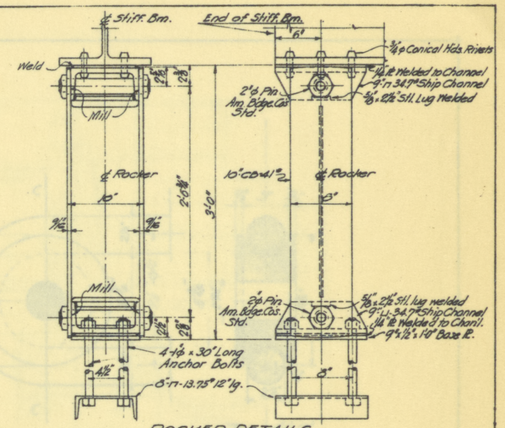
SECTION C-C

⅜"=1'-0"



DIAGONAL BRACING DETAIL

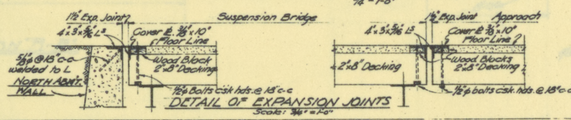
Scale: ½"=1'-0"



ROCKER DETAILS

4-WANTED-THIS

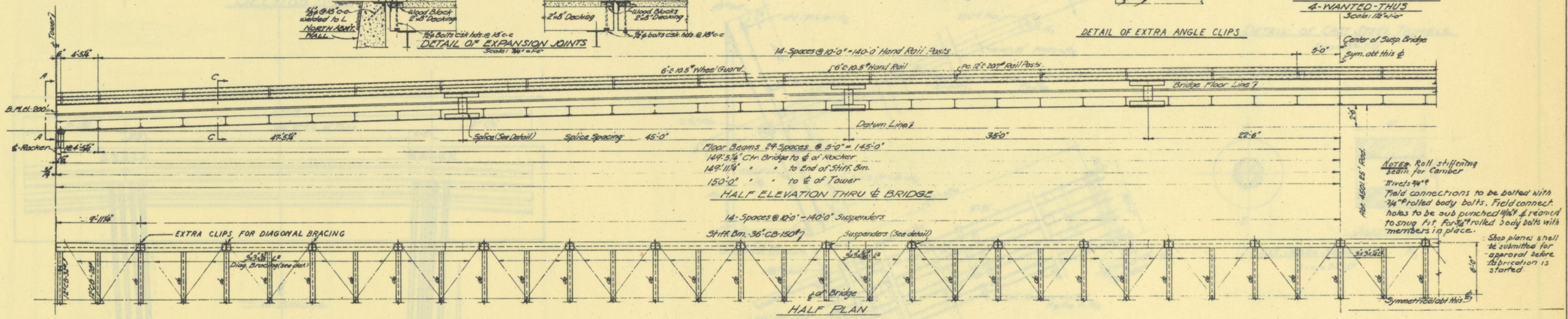
Scale: 12"=1'-0"



DETAIL OF EXPANSION JOINTS

Scale: ¾"=1'-0"

DETAIL OF EXTRA ANGLE CLIPS



HALF ELEVATION THRU ℄ BRIDGE

HALF PLAN

DETAIL OF STIFFENING BEAM

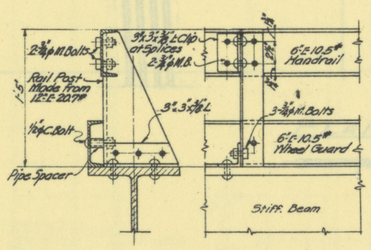
Scale: ⅜"=1'-0"

Notes: Roll stiffening beam for camber

Rivets ⅞"ø

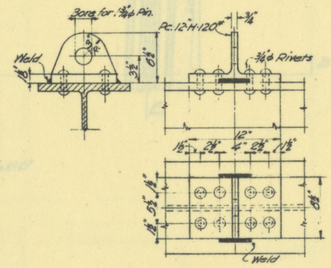
Field connections to be bolted with ⅞" ø rolled body bolts. Field connect. holes to be sub punched 1⅛" ø & reamed to snug fit. For ⅞" ø rolled body bolts with members in place.

Shop plans shall be submitted for approval before fabrication is started.



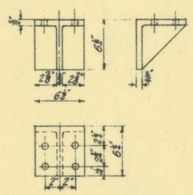
DETAIL OF WHEELGUARD & HANDRAIL CONN.

Scale: 1½"=1'-0"



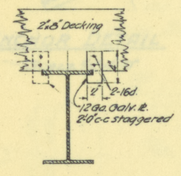
DETAIL OF SUSPENDER

Scale: 1½"=1'-0"



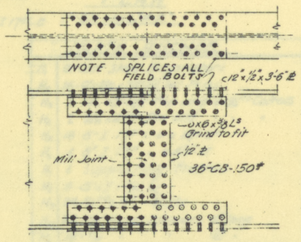
WIND BUMPER BRACKET

CAST STEEL — 4 WANTED



DETAIL OF DECKING CLIP

12 Ga. Galv. Iron — 366 WANTED



STIFFENING BEAM SPLICE

Scale: ¾"=1'-0"

BOLT LIST

No.	Size	Location
64	⅞" x 3½"	C.B. Wheel guard
64	⅞" x 1⅜"	Pipe Spacers at M.B. bolts
128	⅞" x 2½"	M.B. Hand rail
192	⅞" x 2"	M.B. Hand rail Post L Clips
122	⅞" x 12"	M.B. Spacer blocks at Floor
122	⅞"	Mall. Iron Washers

REVISIONS

No.	Date	Item	By	Authority

STIFFENING BEAMS, ETC.

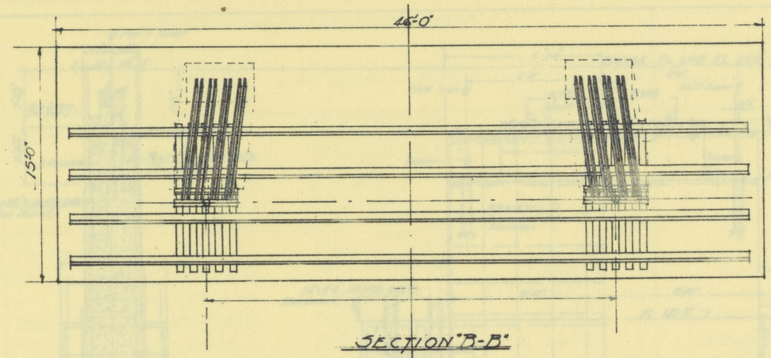
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

300' SUSPENSION BRIDGE

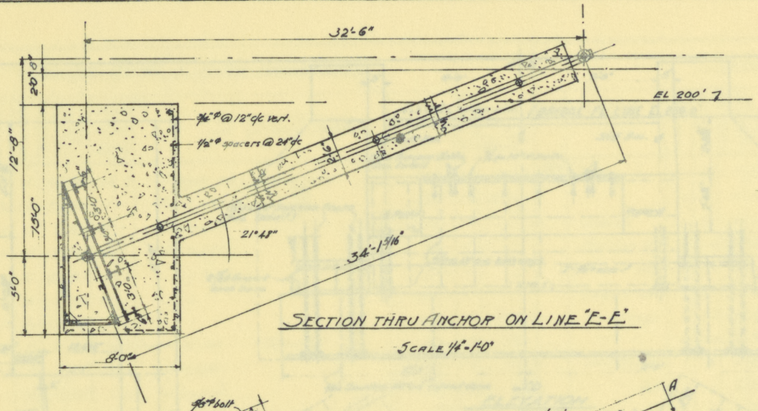
LOADING H-15 ROADWAY 11'
NATIONAL FOREST

Date: Jan. 17th, 1936
Scales: ¾", ⅜", ¾" & 1½" = 1'-0"
Designed - Design Checked - Drawn - Traced - Tracing Checked
J.N.L. - R.R.N. - K.W.N. - E.R.N. - R.S. - J.M. - R.S. - K.W.N.
Approved by
Sheet 5 of 9
Regional Engineer

Contract No. 1 Spec. No. 1 CWA Emergency

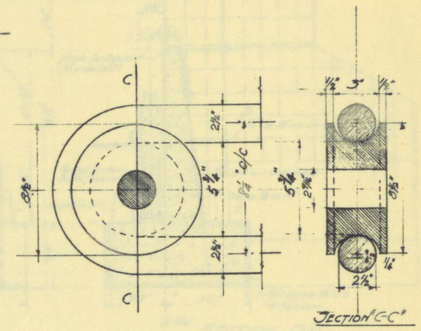


SECTION "B-B"



SECTION THRU ANCHOR ON LINE "E-E"

SCALE 1/16"-1'-0"

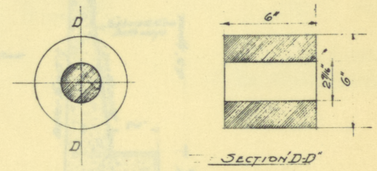


SECTION "C-C"

DETAIL OF CAST STEEL THIMBLE

SCALE 3"-1'-0"

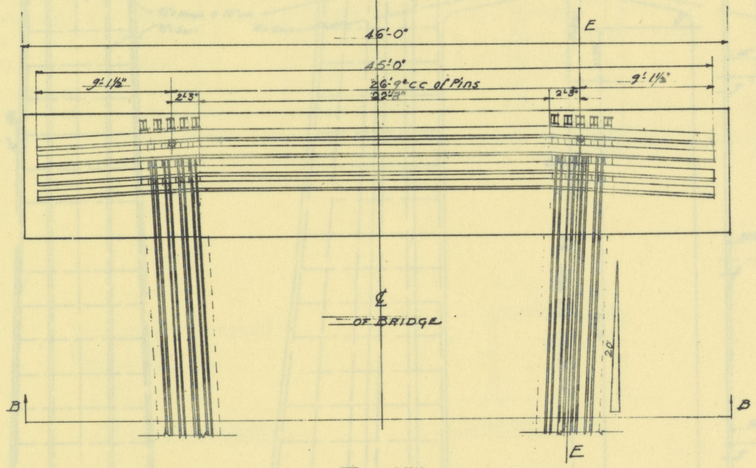
NOTE: Diameter of Rope 1½"



SECTION "D-D"

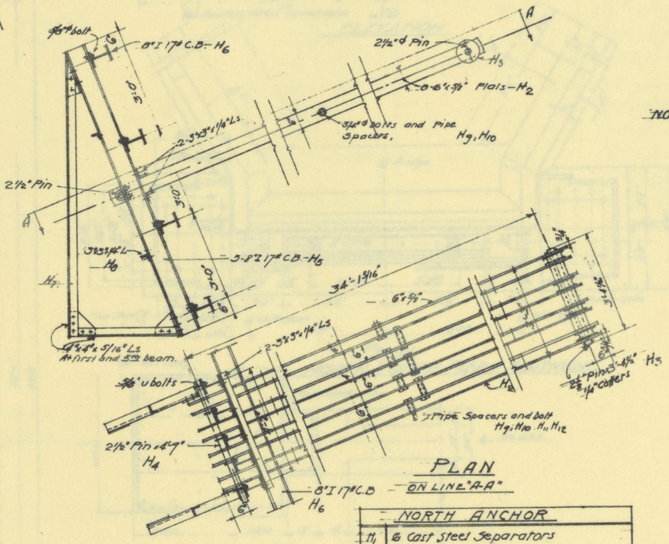
CAST STEEL SEPARATOR H_1

SCALE 3"-1'-0"



PLAN

SCALE 1/16"-1'-0"



PLAN

ON LINE "A-A"

ANCHOR DETAIL

SCALE 1½"-1'-0"

NORTH ANCHOR	
H_1	6 Cast Steel Separators
H_2	16-6"x5/8"x32'-4½" bet. Pins
H_3	2 2½"x3'-4½" Pin and 2-½"ø Cotters
H_4	2 2½"x4'-7" Pin and " " "
H_6	10 8"I 17# C.B x 10'-0"
H_6	4 8"I 17# - x 45'-0"
H_7	4 Supporting Frames
H_8	6 5"x3"x ½" Ls
H_9	24 ⅝"ø 6" bolts
H_{10}	24 ⅞" Pipe Spacers 4' long
H_{11}	18 " " 6" "
	18-¾"x 8" MB

NOTE SOUTH ANCHOR SAME

REVISIONS				
No.	Date	Item	By	Authority

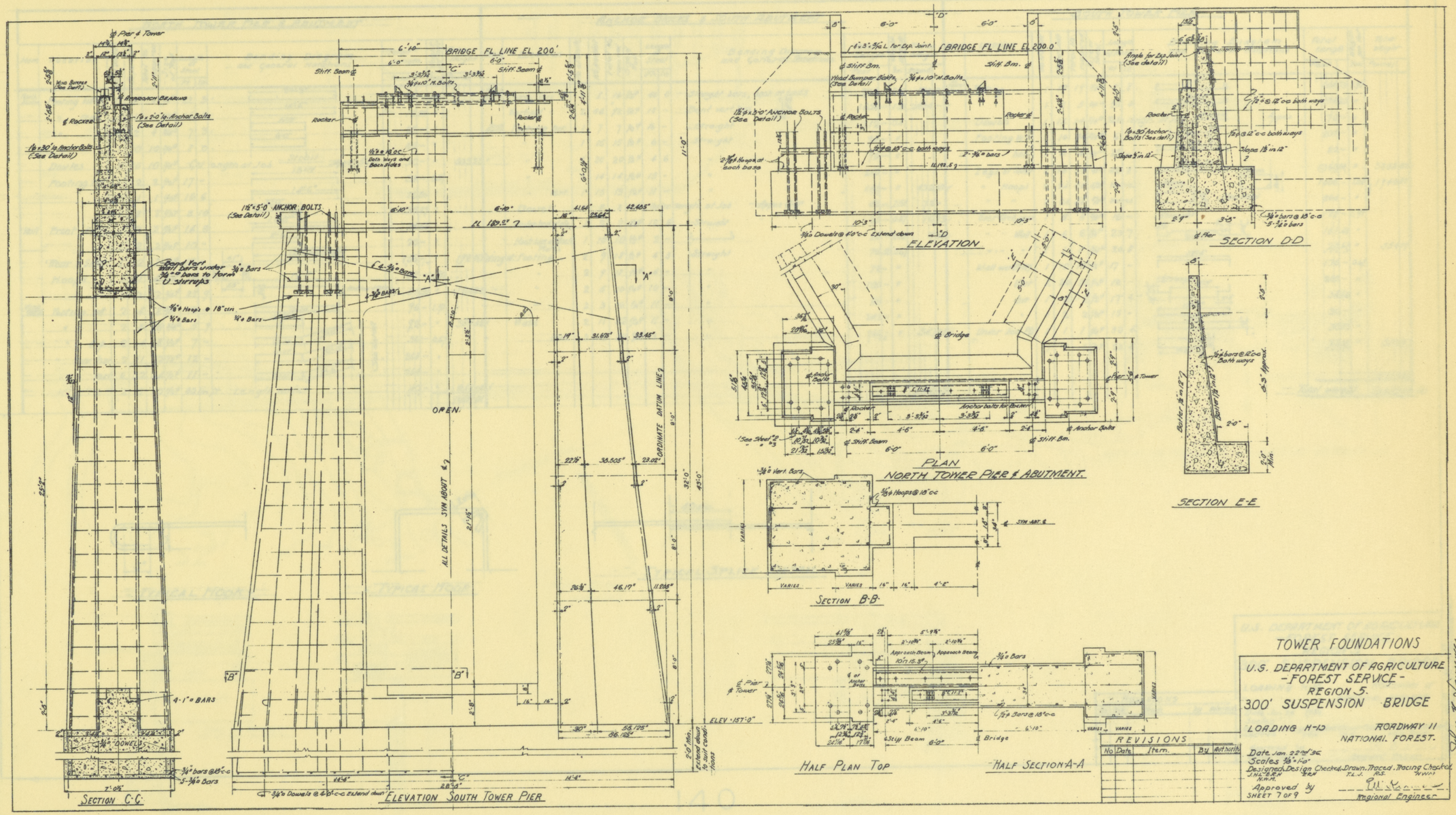
ANCHOR DETAILS

U.S. DEPARTMENT OF AGRICULTURE
-FOREST SERVICE-
REGION 5.
300' SUSPENSION BRIDGE

LOADING H-15 ROADWAY 11
NATIONAL FOREST.

Date Jan. 7, 1936
Scales ½"=1'-0" & 1"=1'-0"
Designed Design Checked Drawn Traced Tracing Checked
"HL" "FAN" "BRM" VAP VAP NWN
Approved by _____
SHEET 6 of 9 Regional Engineer.

Contract Supervised by J. E. Newhouse
Bridge Engineer.


BRIDGE FL LINE EL 200'
ELEVATION
SECTION D-D
PLAN
NORTH TOWER PIER & ABUTMENT
SECTION E-E
SECTION B-B
HALF PLAN TOP
HALF SECTION A-A
SECTION C-C
ELEVATION SOUTH TOWER PIER
ALL DETAILS SYM ABOUT ℄
OPEN.
ORDINATE DATUM LINE
ANCHOR BOLTS (See Detail)
Bond 4 of 7 bars under 3/4" ø bars to form U stirrups
Approach BEARING
Rocker
Shift Beam
Wind Bumper Bolts (See Detail)
Anchor bolts for Bridge
Bridge
Pier & Tower
TOWER FOUNDATIONS
U.S. DEPARTMENT OF AGRICULTURE
-FOREST SERVICE-
REGION 5.
300' SUSPENSION BRIDGE
LOADING H-10 ROADWAY 11
NATIONAL FOREST.
REVISIONS
No. Date Item. By Ant'north
Date Jan. 22nd '36
Scales 3/8"=1'-0"
Designed Design Checked Drawn Traced Tracing Checked
J.N.L.E.R.H. K.H.M. E.R.H. T.L.J. R.S. H.W.H.
Approved by
SHEET 7 of 9
Regional Engineer
Civil Engineer

NORTH TOWER PIER & ABUTMENT

Mark	Location	No of Units	No per Unit	Total No required	Size of Steel	Length of Steel Ft	Length of Steel In	Bending Diagram and General Notations	Total Length Feet	Weight per Foot Pounds	Total Weight Pounds
North Abutm.	Footing bottom	1	4	4	¾" □	22	3	20'-3"	89 —	1.91	
	" rear	1	1	1	¾" □	16	6	14'-6"	16.50	"	
	"	2	2	4	¾" □	7	3	5'-0"	29 —	"	
	"	1	10	10	¾" □	8	0	6'-0"	80 —	"	
	Dowles	1	10	10	¾" □	Get length at Job — Strait — Approx 5'-10			90 —	"	305.20
	Footing top	1	2	2	⅛"	17	—	15'-0"	34 —	0.67	
		1	1	1	1⅛"	16	6	14'-6"	16.50	"	
		1	8	8	1⅛"	3	10	3'-0"	30.67	"	
								13'-0"			
Wall	Front horiz	1	2	2	⅝"	12	3	8'-6"	28.50	"	
		1	2	2	½"	10	—	13'-0" Straight	20 —	"	
	Rear & Side	1	12	12	½"	13	—	4'1" 3'0" 4'5" 19'-9"	156 —	"	192.40
	Hoops	2	2	4	⅜"	14	6		58 —	1.50	
		1	2	2	¾"	25	9		51.50	"	164.25
Wing Wall	Footing bott	2	4	8	¾" □	12	—	11'-0"	96 —	1.91	
	"	2	8	16	¾" □	5	9	3'-9" 5'-0"	92 —	"	359.08
	" top	2	4	8	½"	7	—	2'-0" 2'-0" 10'-0"	56 —	0.67	
	" rear hor	2	11	22	½"	12	—	See detail	264 —	"	
	" " vert	2	12	24	½"	11	—	2'-6" 8'-6"	264 —	"	
	" " "	2	5	10	½"	40 lin ft.		Length varies	40 —	"	4.18.08
											1639.01

ANCHOR BLOCKS & SOUTH ABUTMENT

Mark	Location	No of Units	No per Unit	Total No required	Size of Steel	Length of Steel Ft	Length of Steel In	Bending Diagram and General Notations	Total Length Feet	Weight per Foot Pounds	Total Weight Pounds
Anch Block	Horiz. bars	2	8	16	½" □	46	0	Straight bars, hook at ends	736 —	0.67	493.12
	Vertical "	2	46	92	¾" □	18	—	Bent vert bars	1656 —	1.50	2484 —
South Abutm.	Footing hor.	1	7	7	⅛"	16	—	Straight	112 —	0.67	
	"	1	15	15	½" □	6	—	Straight	90 —	"	
	"	1	20	20	⅞"	4	6	"	90 —	"	
	"	1	14	14	½" □	15	—	"	210 —	"	
	" vert	1	13	13	½" □	11	—	"	143 —	"	432.15
	Dowels	1	8	8	¾" □	Take length at Job — Approx 6'-0"			48 —	1.50	72 —
	Under bed plate	1	2	2	1½"	12	6	Straight	25 —	0.67	16.75
	Hook bars at Anch Blocks	1	10	10	⅞" □	2	—		20 —	0.38	7.60
Wing Wall	Footing	2	9	18	½"	4	3	Straight	76.50	0.67	
	"	2	9	18	½"	4	—	"	72 —	"	
	"	2	5	10	½"	10	—	"	100 —	"	
	"	2	3	6	⅝"	11	—	"	66 —	"	
	Walls	2	11	22	½"	11	—	"	242 —	"	
	Vert.	2	10	20	½"	13	—	"	260 —	"	54.10
											4082.67

SOUTH TOWER PIER

Mark	Location	No of Units	No per Unit	Total No required	Size of Steel	Length of Steel Ft	Length of Steel In	Bending Diagram and General Notations	Total Length Feet	Weight per Foot Pounds	Total Weight Pounds
To Tower Pier	Footing	1	19	19	¾" □	8	8	6'-8" 28'-4"	164.73	1.91	
		1	5	5	¾" □	30	4		152.65	"	
	Dowels	1	14	14	¾" □	Take length at Job — Straight — Approx			70 —	"	
	Footing Vert	2	16	34	¾" □	6	—	3'-0" 18'-0"	204 —	"	
	hor.	1	4	4	¾" □	20	—		80 —	"	
	Legs of Tower	2	16	32	¾" □	42	8	42'-8" lg. Varies	1365.44	"	3888.42
	" Hoops	2	24	48	⅝" □	Varies		Varies See detail	1008 —	1.04	1966.81
	" "	2	24	48	⅝" □	Varies			864 —	"	
	Over Arch open	1	8	8	¾" □	16	—	Straight	128 —	1.91	
	" " Wall	1	6	6	¾" □	23	7	20'-7"	141.48	"	
	" "	1	1	1	¾" □	20	8	13'-4"	20.67	"	554.19
	Wall over El 999	1	10	10	½"	17	—		170 —	0.67	
	Vert	1	20	20	½"	12	—	Straight 4'-8"	240 —	"	
	hor.	1	2	2	½"	17	4	2'-6" 13'-4"	34.66	"	
	"	1	2	2	½"	15	—	13'-4"	30 —	"	
Under bed Pl		1	1	1	1½"	30	4	13'-4" 2'-6"	30.33	"	
		1	1	1	1½"	23	4	8'-8"	23.33	"	353.97
											6743.46
									Total Weight		12435.14 lbs

TYPICAL HOOK

TYPICAL HOOP

TYPICAL SPLICE DETAIL

U.S. DEPARTMENT OF AGRICULTURE
-FOREST SERVICE-
REGION 5
300' SUSPENSION BRIDGE

LOADING H-15 ROADWAY 11'
NATIONAL FOREST

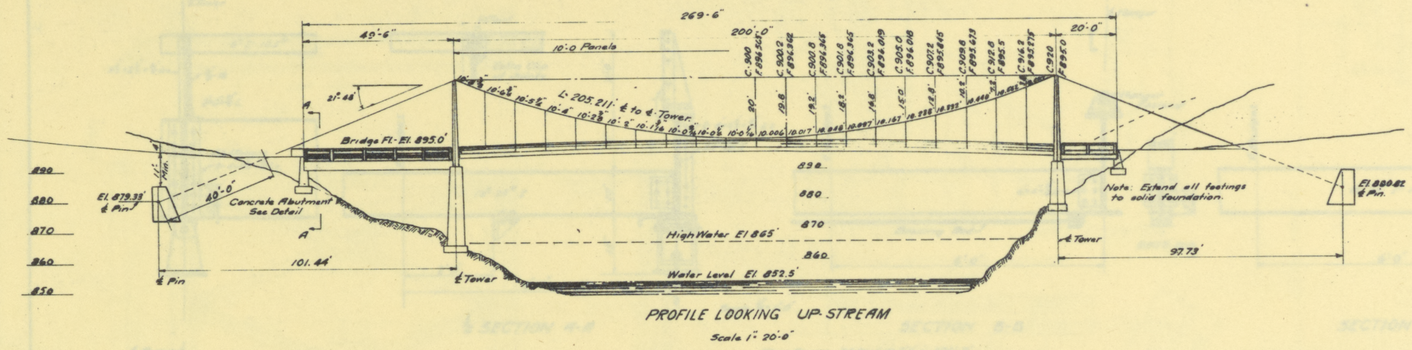
Date Jan 28 1936.
Scales
Designed-Design Checked-Drawn-Traced Tracing Checked
JHLFCH ERW VAP HWB WWM

Approved by _____ Regional Engineer.
Sheet #9 of 9.

REVISIONS

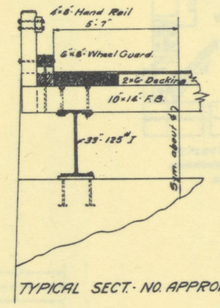
No	Date	Item	by	Approved

Correct John H. Lawrence Civil Engineer

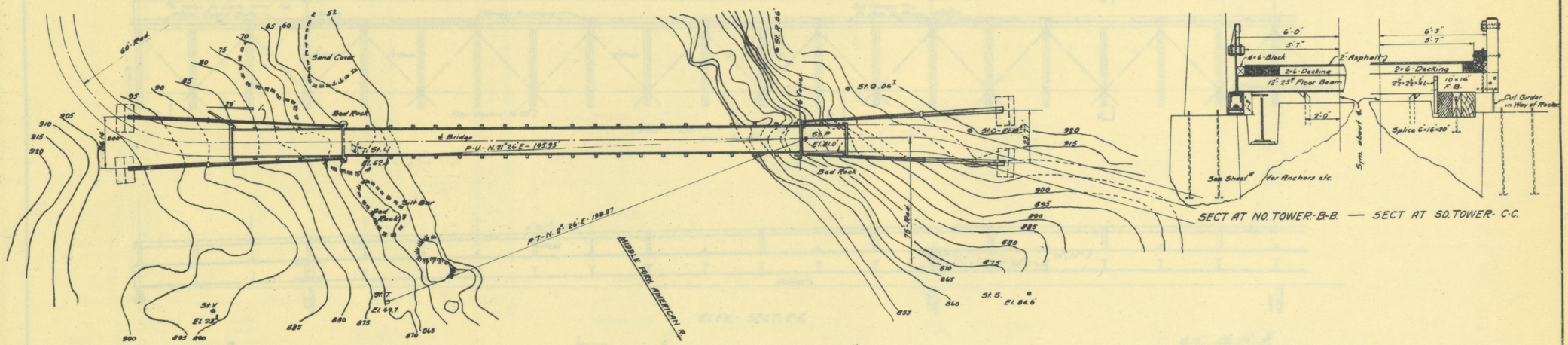


PROFILE LOOKING UP-STREAM

Scale 1" = 20'-0"



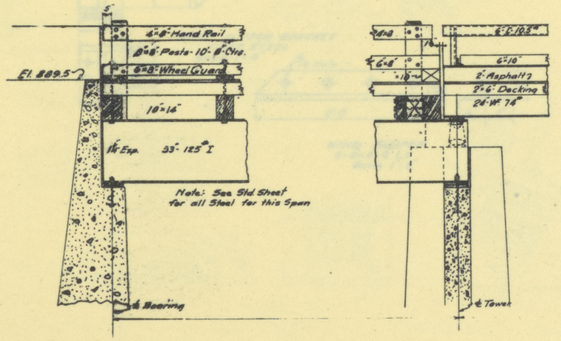
TYPICAL SECT. NO. APPROACH A-A

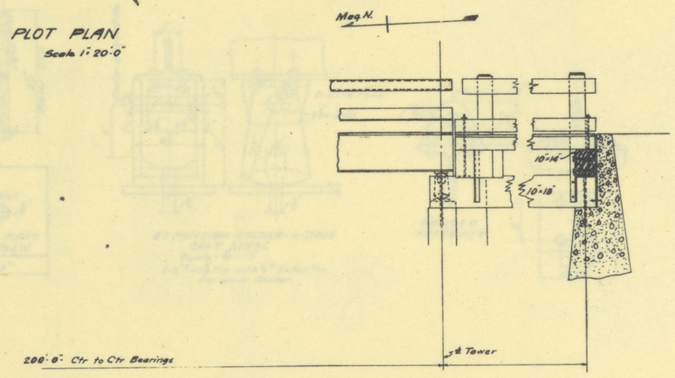


PLOT PLAN

Scale 1" = 20'-0"

SECT AT NO. TOWER-B-B. — SECT AT SO. TOWER- C-C.



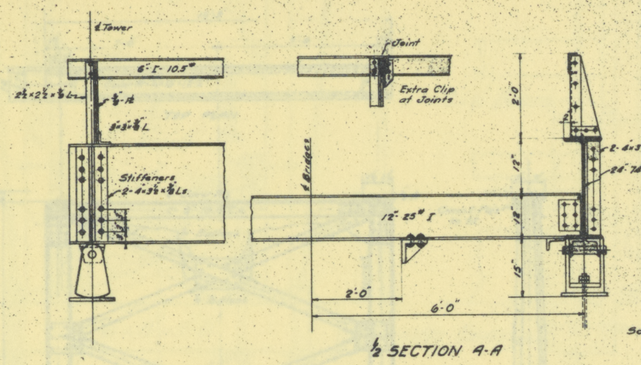


U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER REGIONAL ENGINEER

MIDDLE FORK
AMERICAN RIVER BRIDGE

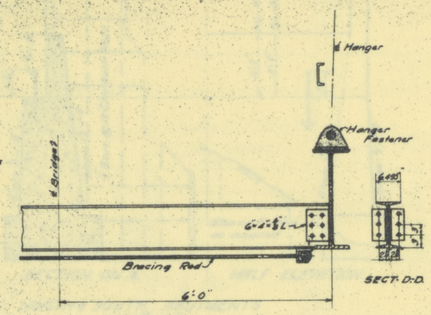
LOADING - H-15 ROADWAY - 12'
ELDORADO NATIONAL FOREST

DESIGNED - JNL - NWM DRAWN NWM TRACED JNW
SCALE - 1"=20' - ½"=1'-0" CHECKED
APPROVED DATE
Sheet - 1 of 3 E.W. Kramer REGIONAL ENGINEER

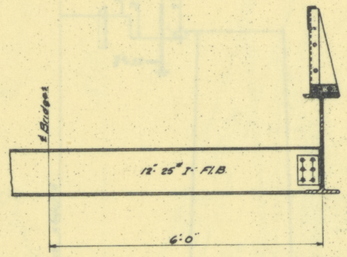


½ SECTION A-A

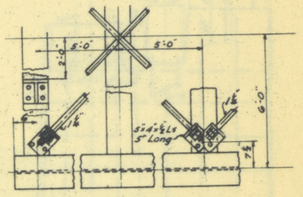
Scale ⅜"=1'-0"



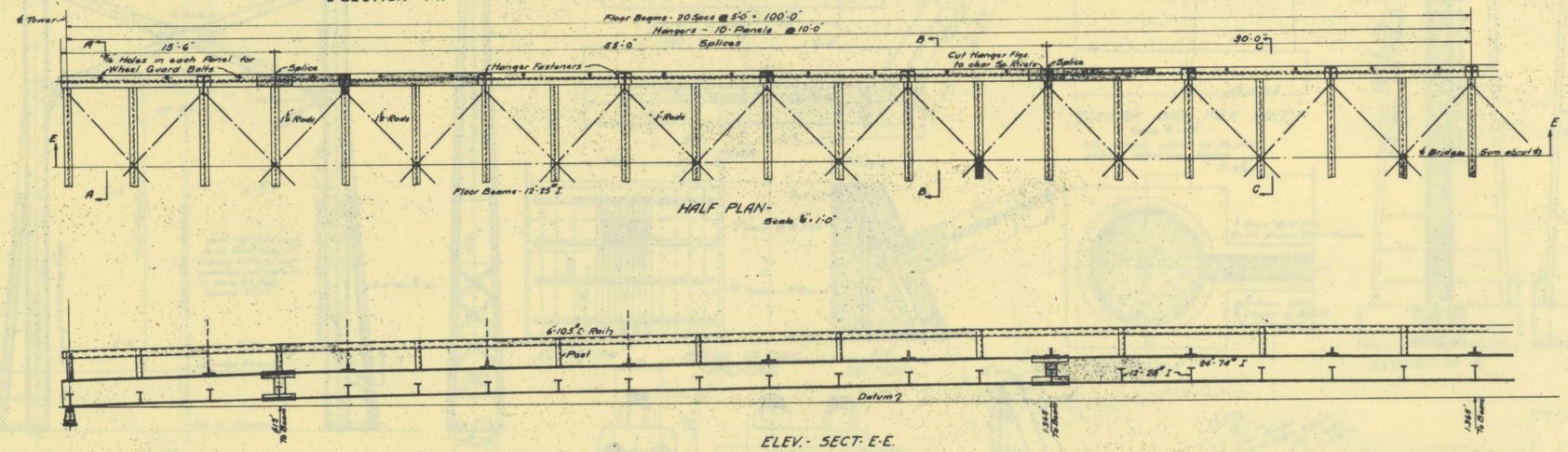
SECTION B-B.



SECTION C.C.

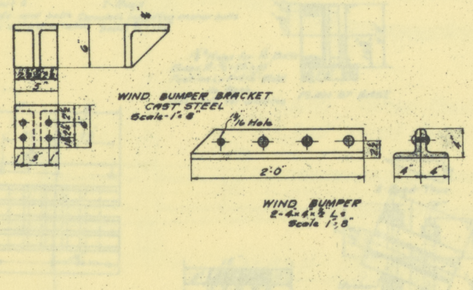


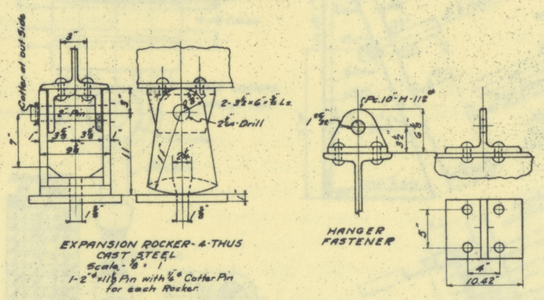
REFLECTED PLAN SHOWING RODS, ETC.
Scale ⅜"=1'-0"

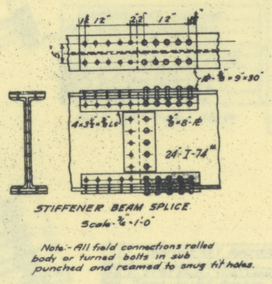


HALF PLAN-
Scale ⅜"=1'-0"

ELEV.- SECT. E-E.







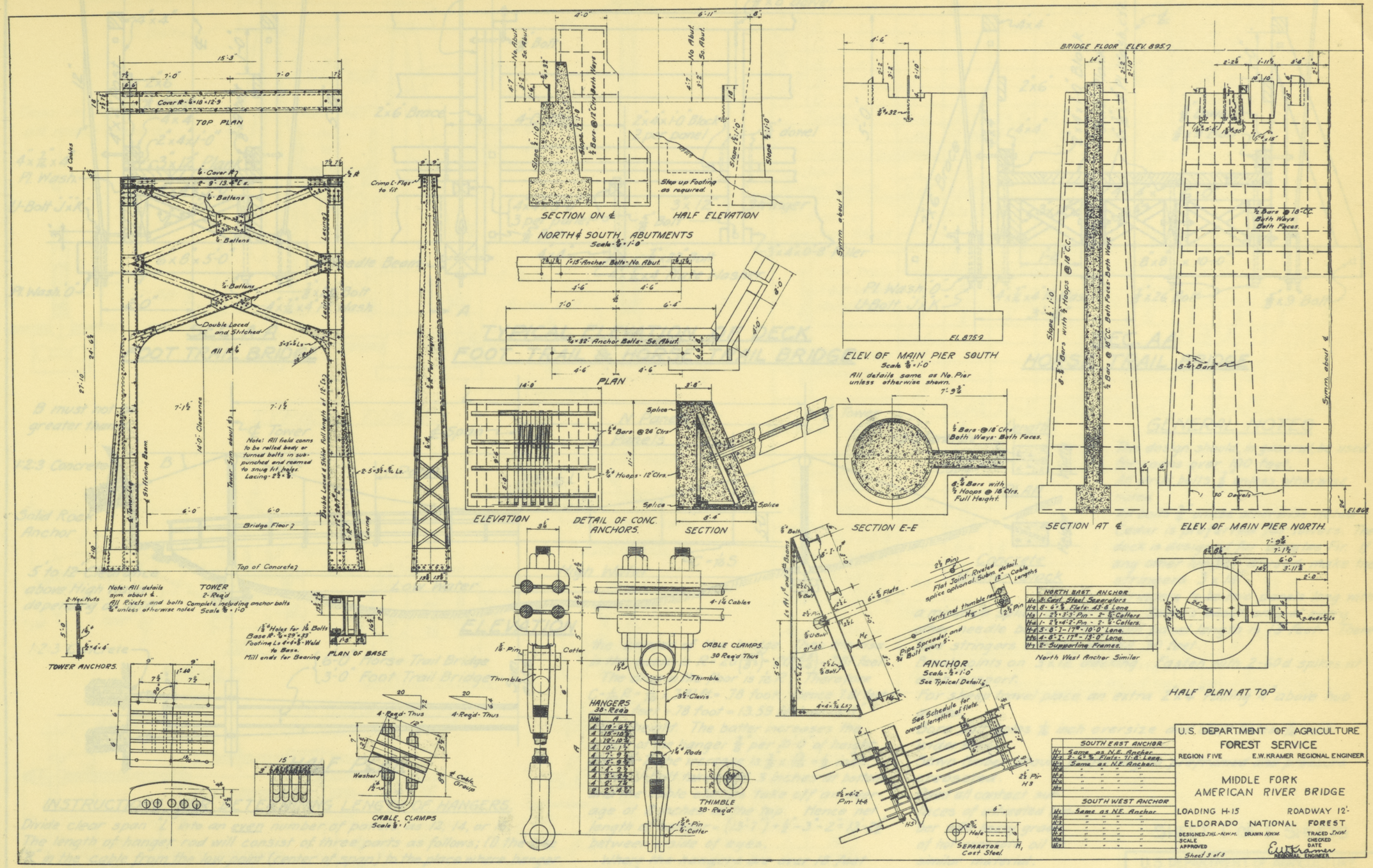
Note:- All field connections rolled body or turned bolts in sub punched and reamed to snug fit holes.

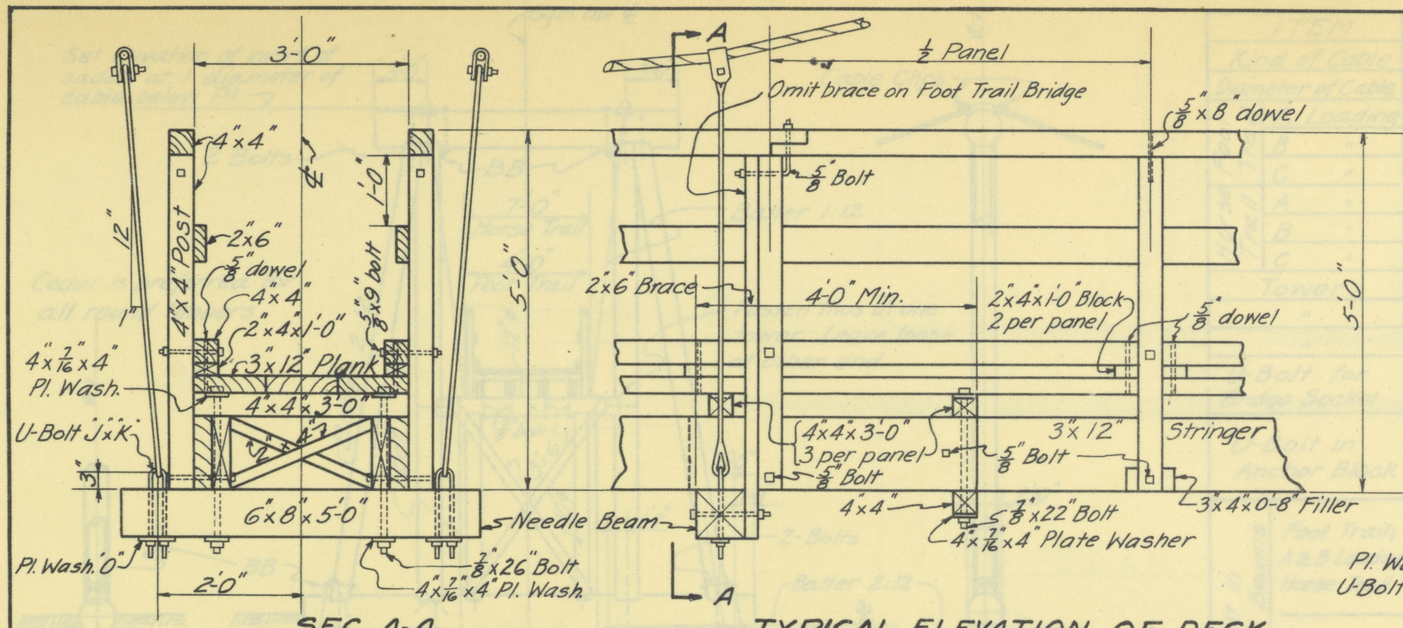
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER REGIONAL ENGINEER

MIDDLE FORK
AMERICAN RIVER BRIDGE

LOADING- H-15 ROADWAY - 12'
ELDORADO NATIONAL FOREST

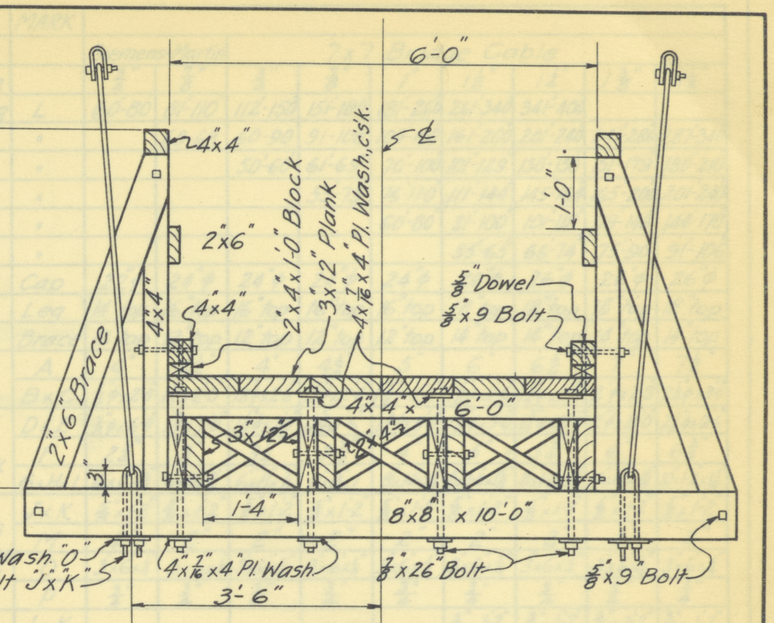
DESIGNED J.N.L. K.H.M. DRAWN K.H.M. TRACED J.H.W.
SCALE CHECKED
APPROVED DATE
Sheet 2 of 3 E.W. Kramer REGIONAL ENGINEER


TOP PLAN
Cover Pl - 6"×18"×12'-9"
TOWER
2-Req'd
Note: All details sym. about ℄.
All Rivets and bolts Complete including anchor bolts unless otherwise noted Scale 3/8"=1'-0"
Double Laced and Stitched
Lacing
Stiffening Beam
Bridge Floor
Top of Concrete
Note: All field conns to be rolled body or turned bolts in sub-punched and reamed to snug fit holes.
Lacing - 2½"×⅜"
Crimp L-Flgs to fit
Full Height
TOWER ANCHORS.
PLAN OF BASE
Base PL - ⅜"×29"×23"
Footing Ls 4"×4"×⅜" Weld to Base.
Mill ends for Bearing
SECTION ON ℄
HALF ELEVATION
NORTH & SOUTH ABUTMENTS
Scale ⅜"=1'-0"
No Abut.
So. Abut.
Slope ½":1'-0"
½" Bars @ 12" C's Both Ways
Slope ¾":1'-0"
Step up Footing as required.
PLAN
1"ø Anchor Bolts - No. Abut.
⅞"ø Anchor Bolts - So. Abut.
ELEVATION
DETAIL OF CONC. ANCHORS.
SECTION
Splice
½" Bars @ 24" C's
⅝" Hoops - 12" C's
ELEV. OF MAIN PIER SOUTH
Scale ⅜"=1'-0"
All details same as No. Pier unless otherwise shown.
½" Bars @ 18" C's Both Ways - Both Faces.
⅝" Bars with ⅝" Hoops @ 18" C's Full Height.
SECTION E-E
ANCHOR
Scale - ½"=1'-0"
See Typical Detail ℄
Flat Joint - Riveted splice optional. Subm. detail
Verify rod thimble reqd.
Pipe Spreader and ¾" Bolt every 5'.
Cable Lengths
HANGERS
30 - Reqd
CABLE CLAMPS
30 Req'd Thus
CABLE CLAMPS
Scale 3"=1'
4 - Reqd - Thus
4 Cable Grips
THIMBLE
38 - Req'd.
SEPARATOR
Cast Steel.
BRIDGE FLOOR ELEV. 895.7
Slope ½":1'-0"
⅝" Bars with ½" Hoops @ 18" C.C.
½" Bars @ 18" C.C. Both Faces Both Ways
½" Bars @ 18" C.C. Both Ways Both Faces
8-1¼" Bars
90° Dowels
SECTION AT ℄
ELEV. OF MAIN PIER NORTH.
Symm. about ℄
EL. 895.7
EL. 876.2
NORTH EAST ANCHOR
H₁ 8 - Cast Steel Separators
H₂ 8 - 6½" Flats - 47'-8" Long.
H₃ 1 - 2½"×3"×3" Pin - 2 - 1¼" Cotters.
H₄ 1 - 2½"×4½"×2" Pin - 2 - ¾" Cotters.
H₅ 5 - 8" I - 17.9# - 10'-0" Long.
H₆ 4 - 8" I - 17.9# - 13'-0" Long.
H₇ 2 - Supporting Frames.
North West Anchor Similar
HALF PLAN AT TOP
SOUTH EAST ANCHOR
H₁ Same as N.E. Anchor
H₂ 2 - 6½" Flats - 11'-8" Long.
H₃ Same as N.E. Anchor
H₄ " " " "
H₅ " " " "
H₆ " " " "
H₇ " " " "
SOUTH WEST ANCHOR
H₁ Same as N.E. Anchor
H₂ " " " "
H₃ " " " "
H₄ " " " "
H₅ " " " "
H₆ " " " "
H₇ " " " "
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION FIVE E.W. KRAMER REGIONAL ENGINEER
MIDDLE FORK AMERICAN RIVER BRIDGE
LOADING H-15 ROADWAY 12'-
ELDORADO NATIONAL FOREST
DESIGNED JHL - NWM. DRAWN NWM. TRACED JHW.
SCALE CHECKED
APPROVED DATE
Sheet 3 of 3
E.W. Kramer
REGIONAL ENGINEER

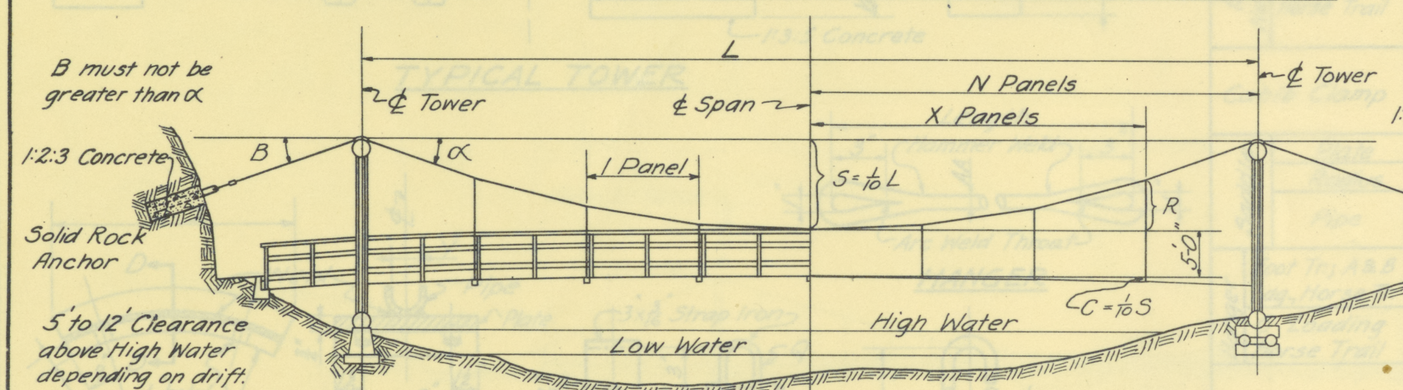


SEC. A-A
FOOT TRAIL BRIDGE

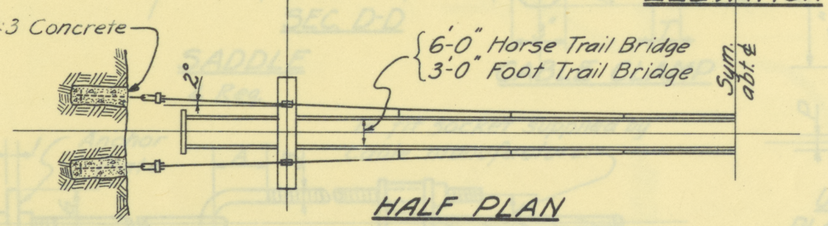
TYPICAL ELEVATION OF DECK
FOOT TRAIL & HORSE TRAIL BRIDGE



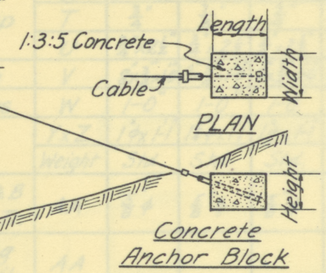
SEC. AA
HORSE TRAIL BRIDGE



ELEVATION



HALF PLAN



GENERAL NOTES

This design should, in general, be used for spans over 100 feet.
All drift bolts 7/8" unless otherwise noted.
All bolts 3/4" unless otherwise noted.
Cedar is preferred for towers. The deck is designed for Douglas Fir. If any other lumber is used, make the stringers 3"x14".
Stringers to be two panels long with a minimum splice of four feet. Splices occur only at every other needle beam. Maximum panel length is 13 feet. Therefore stringers will not exceed 30 feet.
Break joints on 3"x12" decking. Fasten with 2-60d spikes at each support.
For sheep travel place an extra 2"x4" railing 4" above hub guard.
Bore bolt holes 1/16 inch oversize and drift holes 1/16 inch undersize.
Sawn timber should preferably be preframed and pressure creosoted.
Paint all contact surfaces of untreated lumber with heavy grade of hot creosote oil or similar material.

INSTRUCTIONS FOR DETERMINING LENGTH OF HANGERS.

Divide clear span "L" into an even number of panels as 12, 14, or 16. The length of hanger rod will consist of three parts as follows; (1) the rise "R" in the cable from the low point (center of span) to the place where hanger is located (at a panel point), (2) the constant (distance between center of cable and top of needle beam at center of span) five feet and (3) the camber "C" (drop in floor line from the high point at the center).

The amount of rise in the supporting cable is figured by the formulae, $R = S\frac{X^2}{N^2}$. For example suppose the bridge to have a span of 200 feet consisting of 16 panels of 12'-6" each, "N" thus becoming eight. Then the sag "S" = 1/10 of the span or 20 ft. "X" becomes 5 for the panel 62'-6" from the center of the bridge. Then the rise in the cable is $R = 20\left(\frac{5^2}{8^2}\right) = 20\left(\frac{25}{64}\right) = 7.81$ feet.

The drop in the floor is 1/10 R. Therefore $C = \frac{1}{10}R = \frac{1}{10} \times 7.81$ ft. = .78 foot. Hence 7.81 feet + 5.00 feet + .78 foot = 13.59 feet or 13'-7", total height. The batter increases the length of the hanger 3/8" per 10'-0" of height. For 13'-7" the increase is $\frac{3}{8}" \times \frac{13}{10} = \frac{1}{2}$ inch.

The U-Bolt takes off 3 inches at bottom and the cable clamps take off an average of 2 inches at the top. Hence net length of hanger = $(13'-7") + \frac{1}{2}" - 3" - 2" = 13'-2\frac{1}{2}"$ between inside of eyes.

Where the hangers are over 18 feet long, 3/8 inch and 1/2 inch cable may be substituted, respectively, for the 5/8 inch and 3/4 inch rods. Use two clips and thimble on each end of cable hanger.

SHEET 1 OF 2 SHEETS

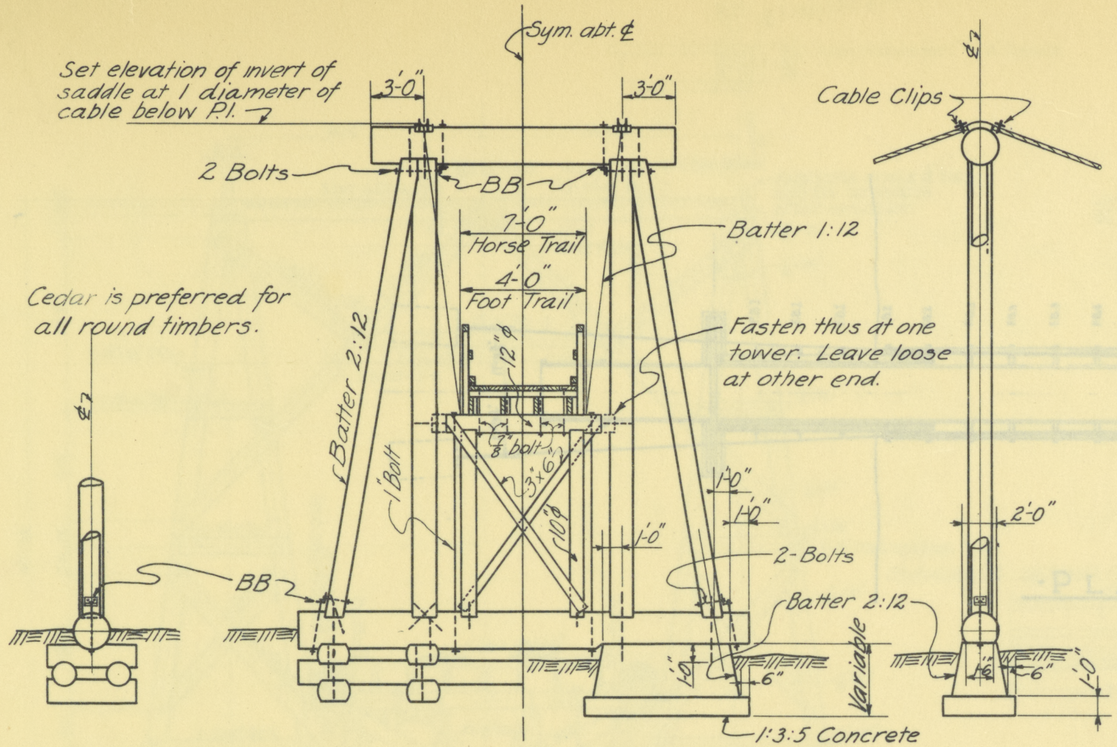
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

SUSPENSION BRIDGES

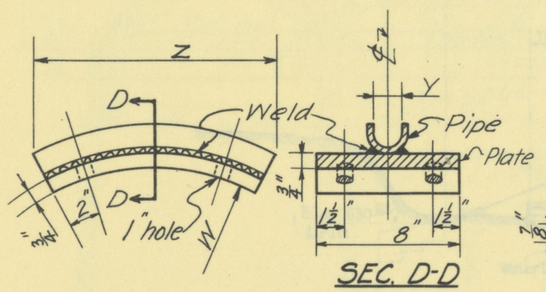
FOOT AND HORSE TRAIL
60 FT. TO 400 FT. SPAN
MARCH 1935

DESIGNED BY R.W.L. DRAWN BY A.O.P.

5-M-37

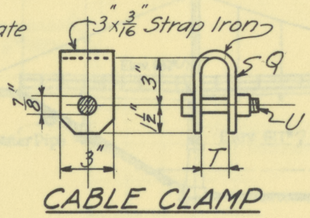


TYPICAL TOWER

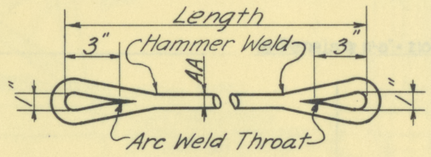


SADDLE
4 Req.

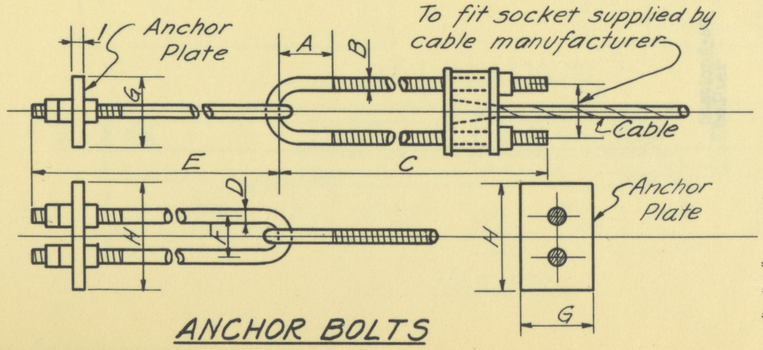
SEC. D-D



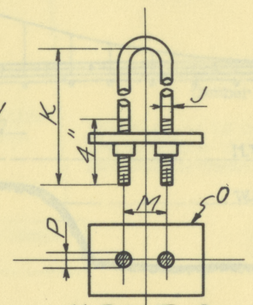
CABLE CLAMP



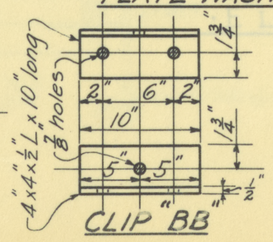
HANGER



ANCHOR BOLTS
4 Sets Req.



U BOLT & PLATE WASHER



CLIP "BB"
8 Req.

ITEM		MARK									
Kind of Cable			Siemens-Martin		7x7 Bridge Cable						
Diameter of Cable			¾"	⅞"	¾"	⅞"	1"	1⅛"	1¼"	1⅜"	1½"
Foot Trail	A Loading	L	60'-80'	81'-110'	112'-150'	151'-180'	181'-260'	261'-340'	341'-400'		
	B "	"		60-69	60'-90'	91'-108'	109'-160'	161'-200'	201'-240'	241'-286'	287'-340'
	C "	"			50'-60'	61'-69'	70'-100'	101'-129'	130'-150'	151'-179'	180'-210'
Horse Trail	A "	"				55'-75'	76'-110'	111'-144'	145'-164'	165'-200'	201'-240'
	B "	"					60'-80'	81'-100'	101'-118'	119'-143'	144'-170'
	C "	"						55'-65'	66'-74'	75'-90'	91'-106'
Tower		Cap	22"ϕ	24"ϕ	24"ϕ	24"ϕ	24"ϕ	26"ϕ	26"ϕ	26"ϕ	26"ϕ
"		Leg	14"top	16"top	16"top	16"top	16"top	18"top	18"top	18"top	18"top
"		Brace	12"top	12"top	12"top	12"top	12"top	14"top	14"top	14"top	14"top
U-Bolt for Bridge Socket		A	4"	4½"	4"	4½"	5"	6"	6½"	7"	7½"
		B x C	⅞"ϕx2'-0"	1"ϕx2'-0"	1⅛"ϕx2'-6"	1¼"ϕx2'-6"	1⅜"ϕx2'-6"	1⅛"ϕx2'-6"	1¾"ϕx2'-6"	2"ϕx2'-8"	2¼"ϕx3'-0"
U-Bolt in Anchor Block		D x E	⅞"ϕx6'-0"	1"ϕx7'-0"	1⅛"ϕx7'-0"	1¼"ϕx7'-6"	1⅜"ϕx9'-0"	1⅛"ϕx9'-6"	1¾"ϕx10'-0"	2"ϕx12'-0"	2⅛"ϕx12'-6"
		F	2¾"	3"	3½"	3¾"	4"	5"	5¼"	6"	6¾"
		G x H x I	6"x6"x¾"	6"x8"x¾"	6"x8"x⅞"	8"x8"x1"	8"x10"x1⅛"	8"x1'-0"x1⅛"	8"x1'-2"x1¼"	10"x1'-2"x1¼"	10"x1'-4"x1¼"
U-Bolt in Needle Beams	Foot Trail; A&B Loading Horse Trail	J x K	⅝"x1'-2"	⅝"x1'-2"	⅝"x1'-2"	⅝"x1'-2"	⅝"x1'-2"	⅝"x1'-2"	⅝"x1'-2"	⅝"x1'-2"	⅝"x1'-2"
		M	2"	2"	2"	2"	2"	2"	2"	2"	2"
		O	3"x6"x¼"	3"x6"x¼"	3"x6"x¼"	3"x6"x½"	3"x6"x¼"	3"x6"x¼"	3"x6"x¼"	3"x6"x¼"	3"x6"x¼"
		P	¾"	¾"	¾"	¾"	¾"	¾"	¾"	¾"	¾"
	C Loading Horse Trail	J x K						¾"x1'-2"	¾"x1'-2"	¾"x1'-2"	¾"x1'-2"
		M						2¼"	2¼"	2¼"	2¼"
		O						3½"x7"x⅜"	3½"x7"x⅜"	3½"x7"x⅜"	3½"x7"x⅜"
		P						⅞"	⅞"	⅞"	⅞"
		Q	3"x10"x3/16"	3"x10"x3/16"	3"x10"x3/16"	3"x10"x3/16"	3"x10"x3/16"	3"x10¼"x3/16"	3"x10¼"x3/16"	3"x10½"x3/16"	3"x10½"x3/16"
Cable Clamp		T	¾"	⅞"	¾"	⅞"	1"	1⅛"	1¼"	1⅜"	1½"
		U	¾"x2½"	¾"x2½"	¾"x2½"	¾"x2½"	¾"x2½"	¾"x3"	¾"x3"	¾"x3"	¾"x3"
Saddle	Plate	V	8"x¾"x1'-0"	8"x¾"x1'-0"	8"x¾"x1'-0"	8"x¾"x1'-0"	8"x¾"x1'-1"	8"x¾"x1'-2"	8"x¾"x1'-2"	8"x¾"x1'-3"	8"x¾"x1'-4"
	Radius	W	1'-0"	1'-0"	1'-0"	1'-0"	1'-2"	1'-4"	1'-5"	1'-6"	1'-8"
	Pipe	Y x Z	1"ϕx1'-1"	1¼"ϕx1'-1"	1"ϕx1'-1"	1¼"ϕx1'-1"	1¼"ϕx1'-2"	2"ϕx1'-3"	2"ϕx1'-3"	2½"ϕx1'-4"	2½"ϕx1'-5"
		Weight	Std.	Std.	Std.	Std.	Std.	Dbl.X Str.	Dbl.X.Str.	Dbl.X.Str.	Dbl.X.Str.
Hanger	Foot Tr.; A & B Ldg., Horse Tr.	AA	⅝"ϕ	⅝"ϕ	⅝"ϕ	⅝"ϕ	⅝"ϕ	⅝"ϕ	⅝"ϕ	⅝"ϕ	⅝"ϕ
	C Loading Horse Trail	AA						¾"ϕ	¾"ϕ	¾"ϕ	¾"ϕ
Anchor Block		Height	3'-0"	3'-0"	4'-0"	4'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"
		Width	4'-0"	4'-0"	4'-6"	5'-0"	5'-0"	6'-0"	6'-0"	6'-0"	7'-0"
		Length	5'-0"	6'-0"	5'-0"	6'-0"	6'-0"	7'-0"	8'-0"	9'-0"	9'-6"
Clip		BB	4"x4"x½"L x10"long	4"x4"x½"L x10"long	4"x4"x½"L x10"long	4"x4"x½"L x10"long	4"x4"x½"L x10"long	4"x4"x½"L x10"long	4"x4"x½"L x10"long	4"x4"x½"L x10"long	4"x4"x½"L x10"long

LIVE LOADS

Bridge	Load	Feet of Snow	Per lin. ft. of Bridge
Foot Tr.	A	1	50#
	B	5	150#
	C	10	300#
Horse Tr.	A	1	160#
	B	5	300#
	C	10	600

SHEET 2 OF 2 SHEETS

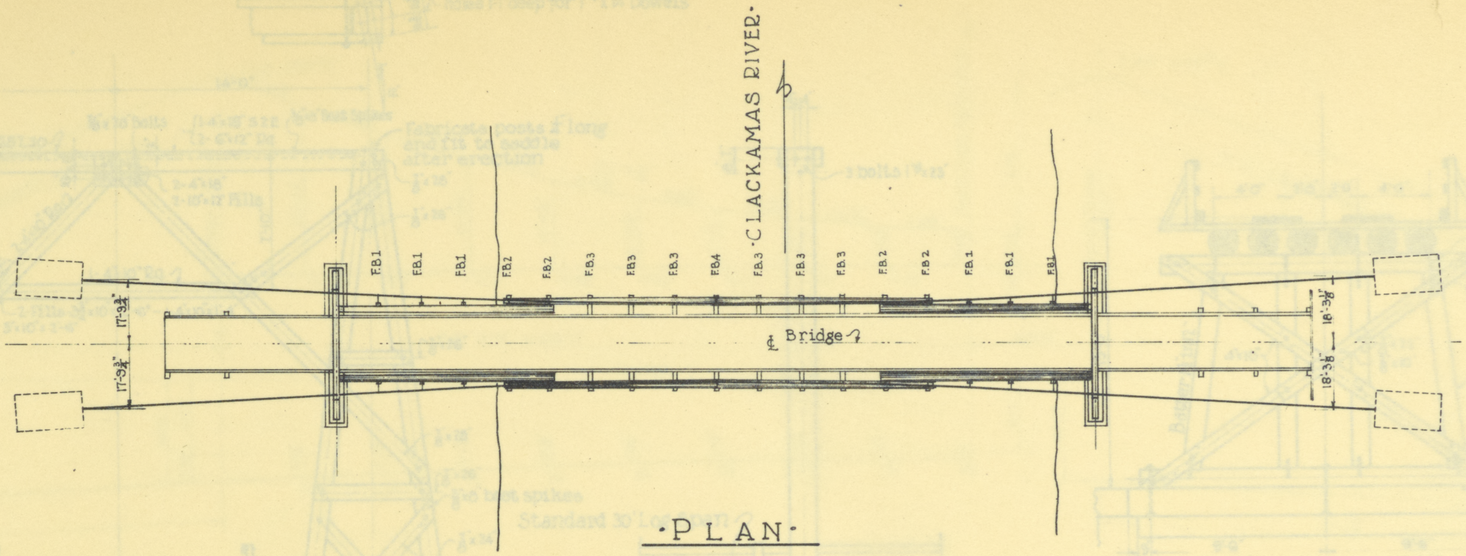
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

SUSPENSION BRIDGES

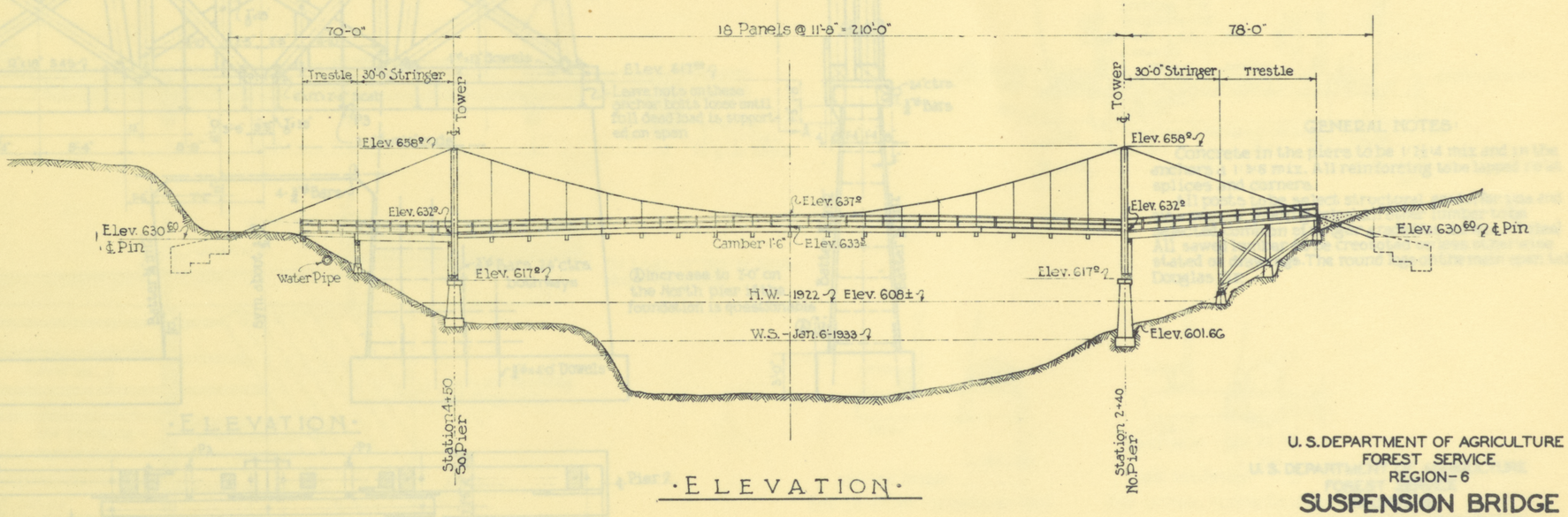
FOOT AND HORSE TRAIL
60 FT. TO 400 FT. SPAN
MARCH 1935

DESIGNED BY R.W.L. DRAWN BY A.O.P.

5-M-37



·PLAN·



·ELEVATION·

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

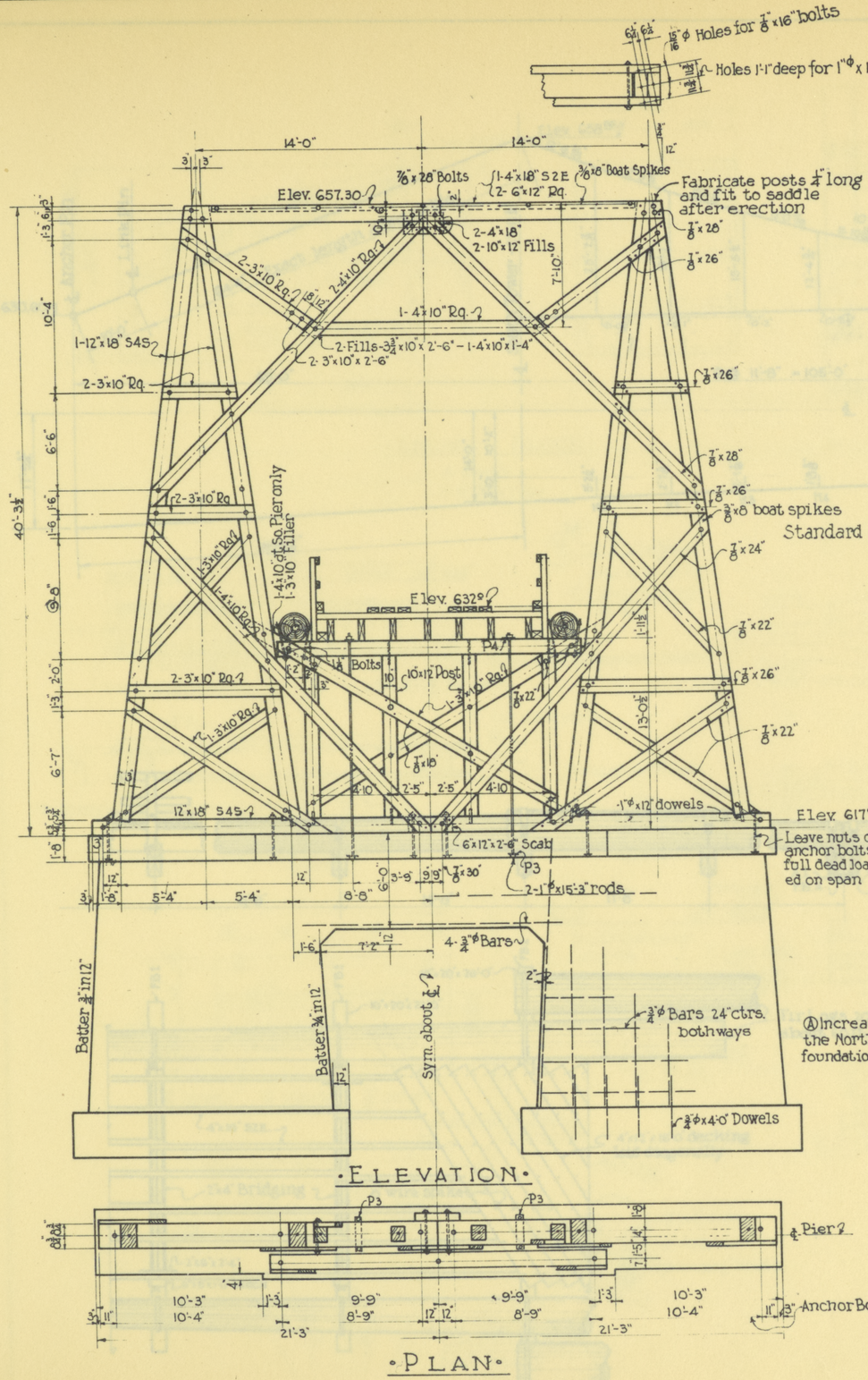
SUSPENSION BRIDGE
CLACKAMAS RIVER

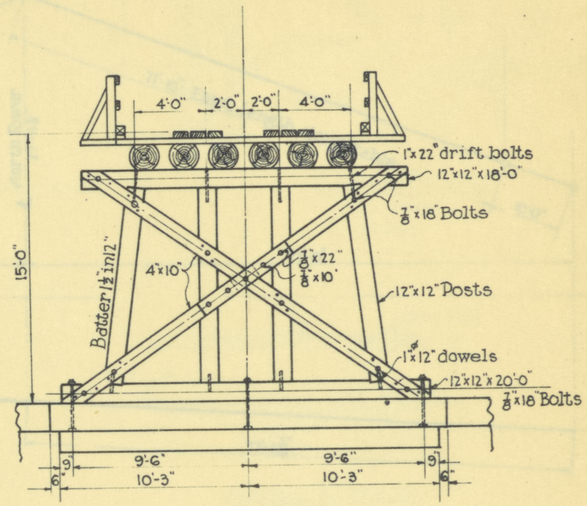
NEAR NORTH FORK
H-15 LOADING

SHEET 1 OF 4 SHEETS

6B-101	Survey	Design	Drawn	Traced	Checked
	Swanson 11-33-34	R.W.L. 2-34	R.W.L. 2-34	J.W.O. 2-34	R.W.L. 2-34

6-M-18





SECTION A-A

All lumber in this bent to be untreated. round logs may be used if available.

GENERAL NOTES:

Concrete in the piers to be 1:2½:4 mix and in the anchors a 1:3:5 mix. All reinforcing to be lapped 2'-0" at splices and corners.

All posts to be select structural grade (Par. 210a and 218a. W.C.L.A. grading rules). All other lumber to be selected common stringer grade (Par. 203 W.C.L.A. rules). All sawed lumber to be creosoted unless otherwise stated on drawings. The round logs on the main span to be Douglas fir.

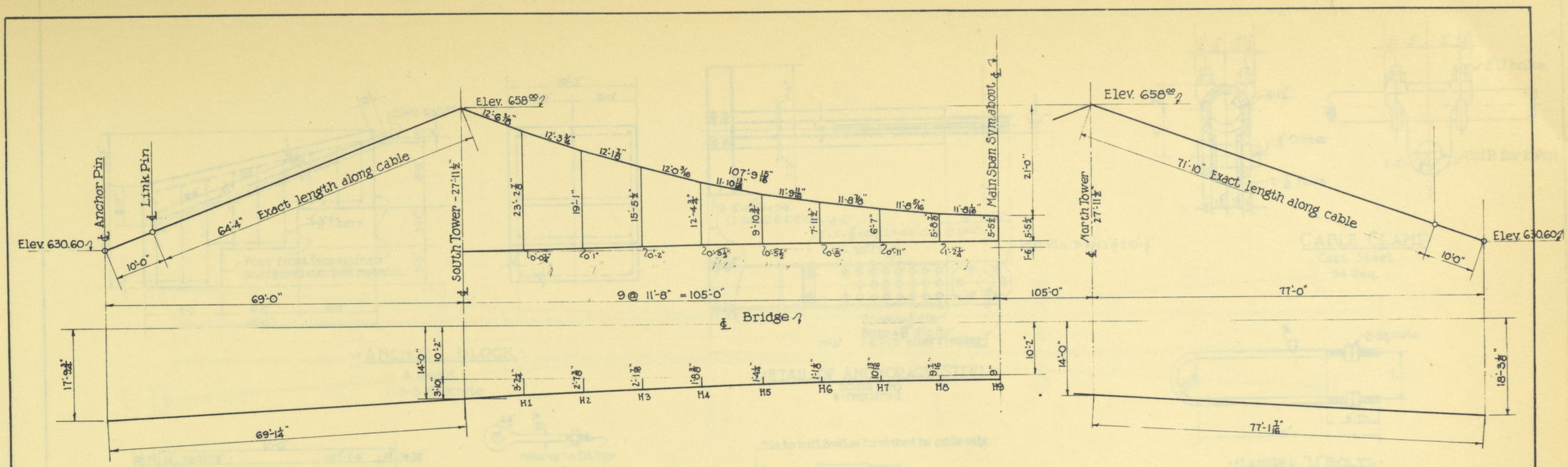
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

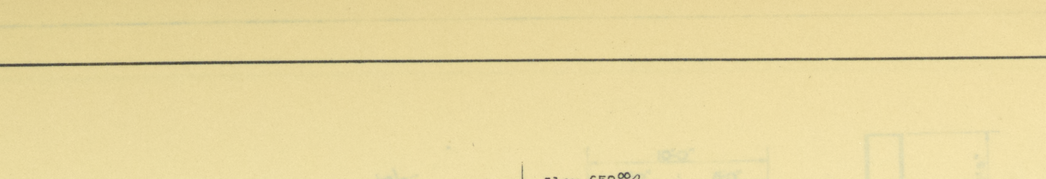
SUSPENSION BRIDGE
CLACKAMAS RIVER

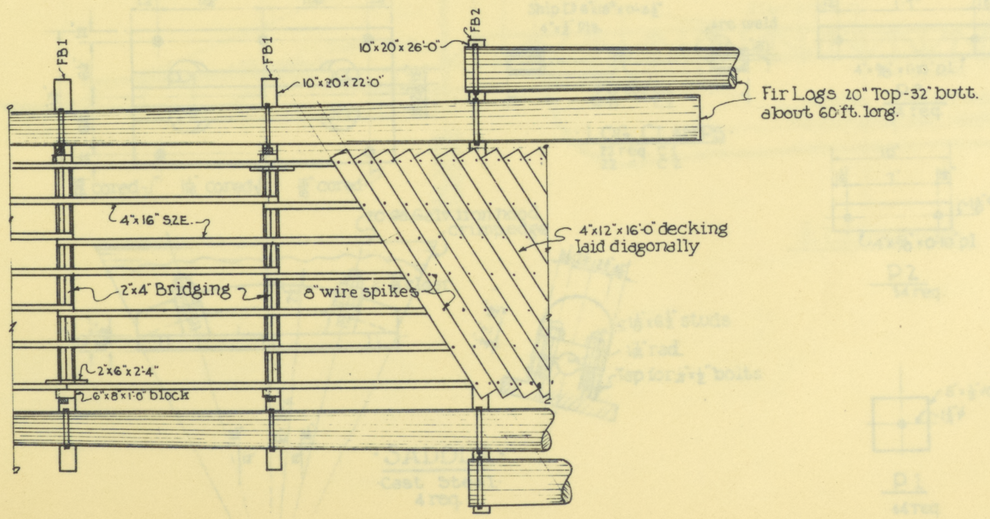
NEAR NORTH FORK
H-15 LOADING

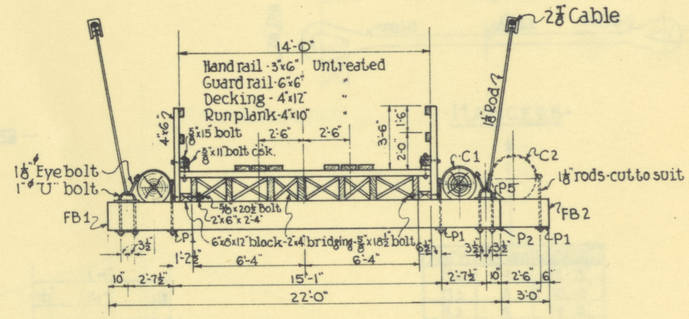
SHEET 2 OF 4 SHEETS

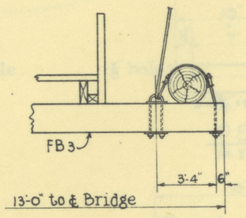
6B-101	Survey	Design	Drawn	Traced	Checked
	Swanson 11-3-34	R.W.L. Feb. 34	R.W.L. Feb. 34	J.W.O. Feb. 34	R.W.L. Feb. 34











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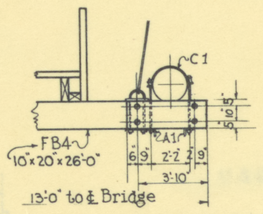

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U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

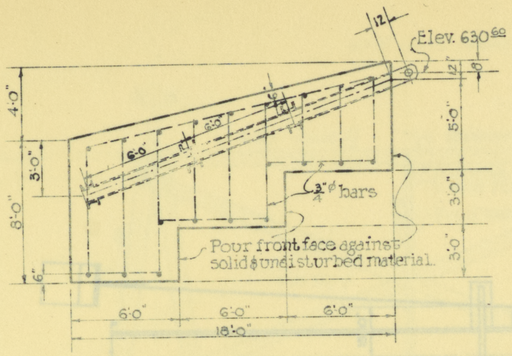
SUSPENSION BRIDGE
CLACKAMAS RIVER

NEAR NORTH FORK
H-15 LOADING

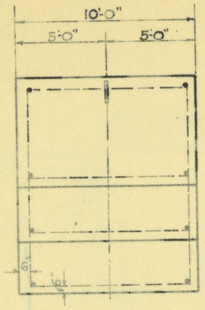
SHEET 3 OF 4 SHEETS

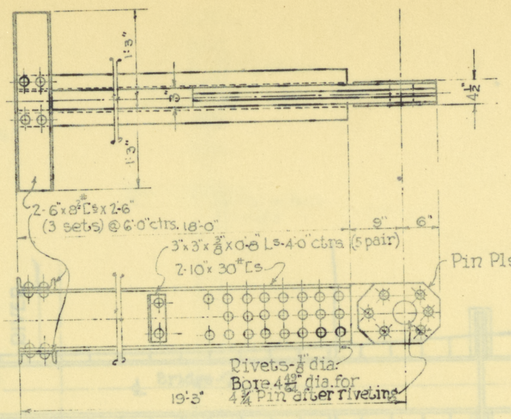
6B-101

Survey	Design	Drawn	Traced	Checked
Swanson 1-3-34	R.W.L. 2-34	R.W.L. 2-34	J.W.O. 2-34	R.W.L. 2-34

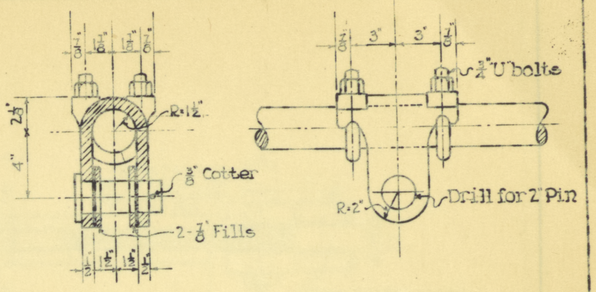


·ANCHOR BLOCK·
4 Req'd
1:3:5 Concrete

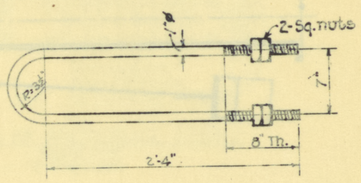




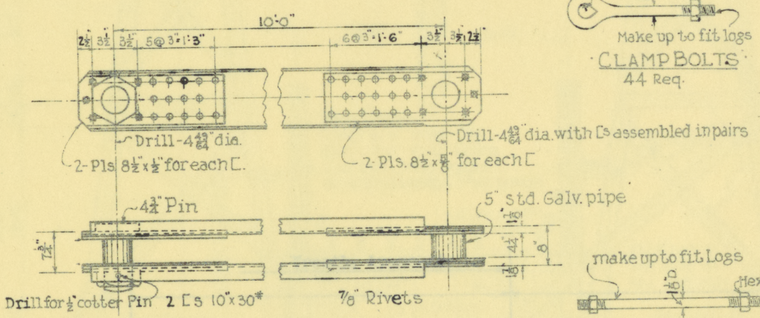
DETAIL OF ANCHORAGE STEEL
Scale 1"=1'-0
4 required



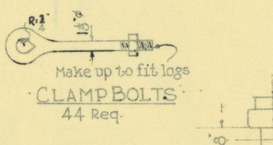
CABLE CLAMP
Cast Steel
34 Req.



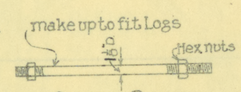
·HANGER 'U' BOLTS·
34 req.



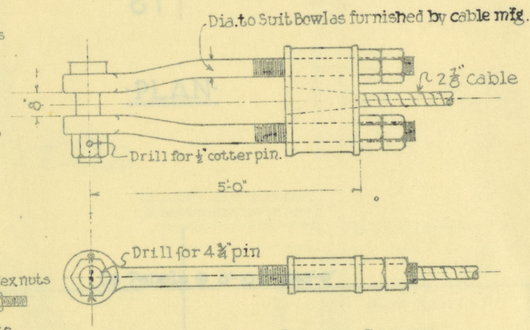
·EXTENSION LINK·
4 Req'd.



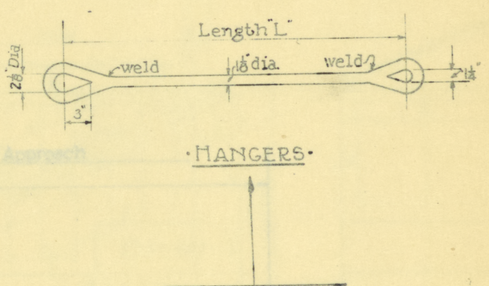
CLAMP BOLTS
44 Req.



CLAMP BOLTS
44 req.

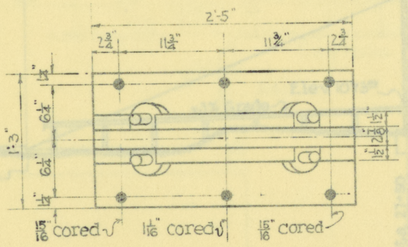


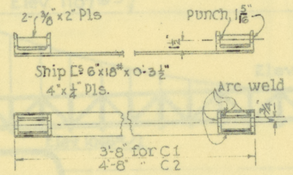
·STANDARD OPEN BRIDGE SOCKET·
Forged Steel
4 req.



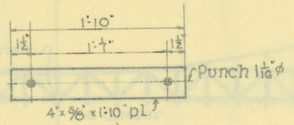
·HANGERS·

Mark	No. Req	Length 'L'
H1	4	22'-8"
H2	4	18'-5"
H3	4	14'-9"
H4	4	11'-8"
H5	4	9'-2"
H6	4	7'-3"
H7	4	5'-10"
H8	4	5'-0"
H9	2	4'-8"

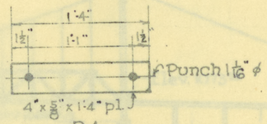




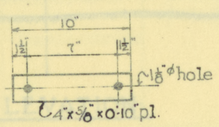
·LOG CLAMPS·
22 req. C1
22 " C2



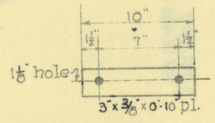
P3
4 req.



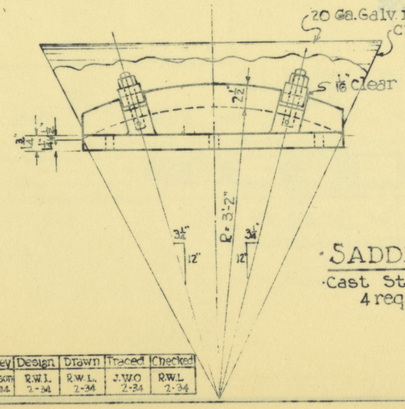
P4
4 req.



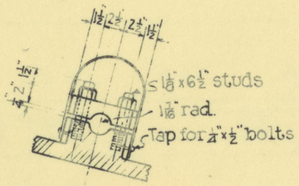
P2
34 req.

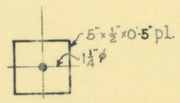


P5
34 req.

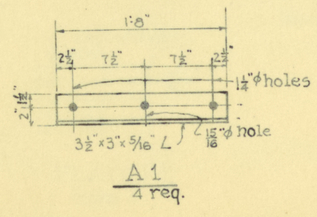


·SADDLE·
Cast Steel
4 req.





P1
44 req.



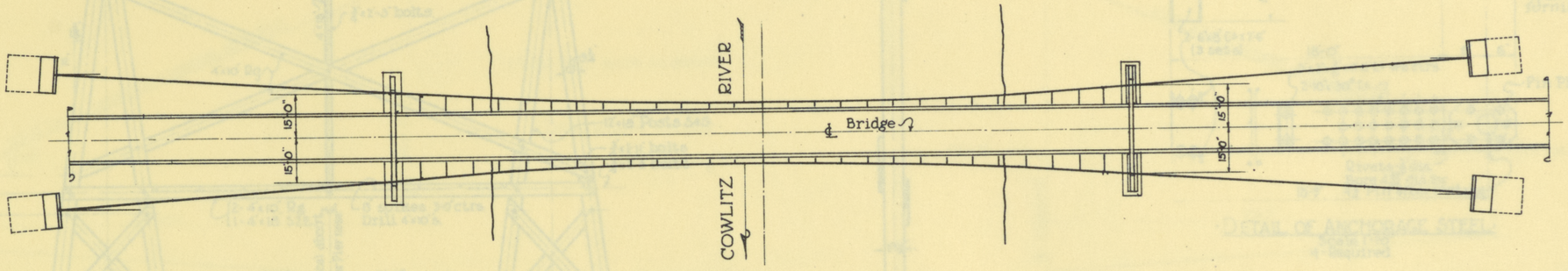
A1
4 req.

6B-101	Survey	Design	Drawn	Traced	Checked
	Swanson 1-3-34	R.W.L. 2-34	R.W.L. 2-34	J.W.O. 2-34	R.W.L. 2-34

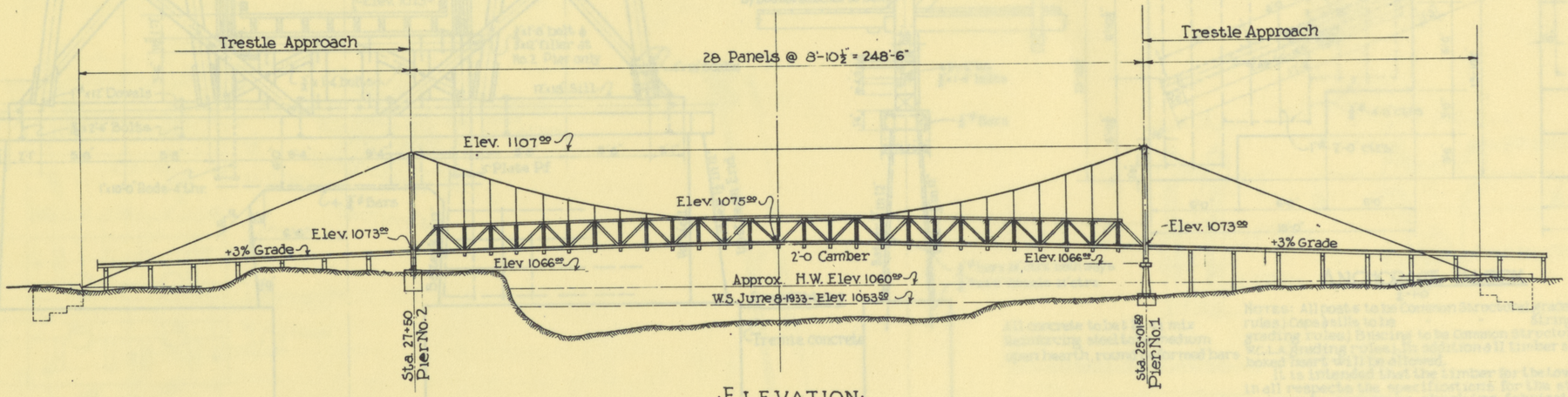
U S DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-6

SUSPENSION BRIDGE
CLACKAMAS RIVER

NEAR NORTH FORK
H-15 LOADING
SHEET 4 OF 4 SHEETS



·PLAN·



·ELEVATION·

NOTE: See sheet No. 4 for revised Anchorage data.

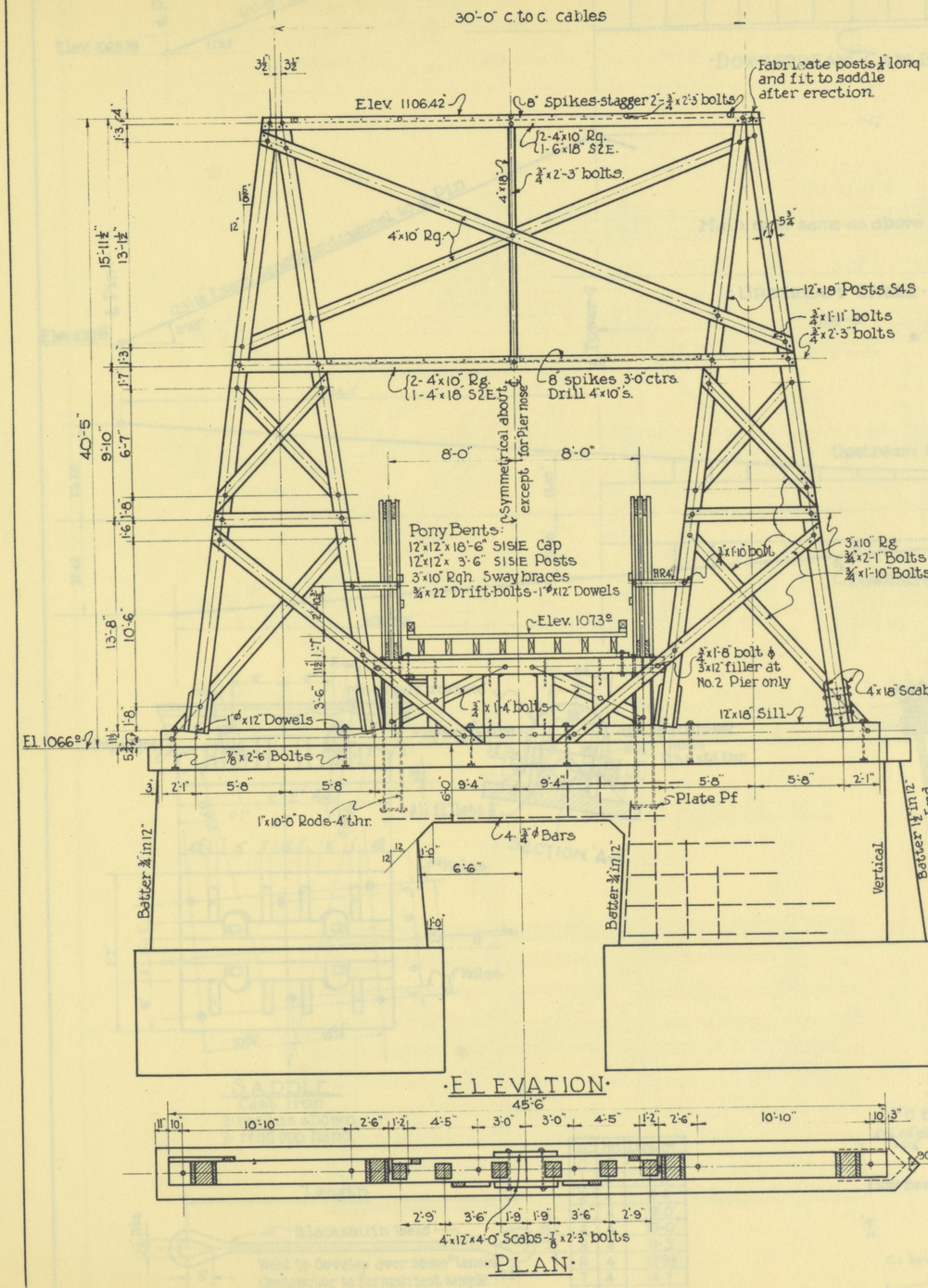
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
LEWIS COUNTY-WASHINGTON

SUSPENSION BRIDGE
AT PACKWOOD-WASH.

SHEET 1 OF 7 SHEETS
H-15 LOADING

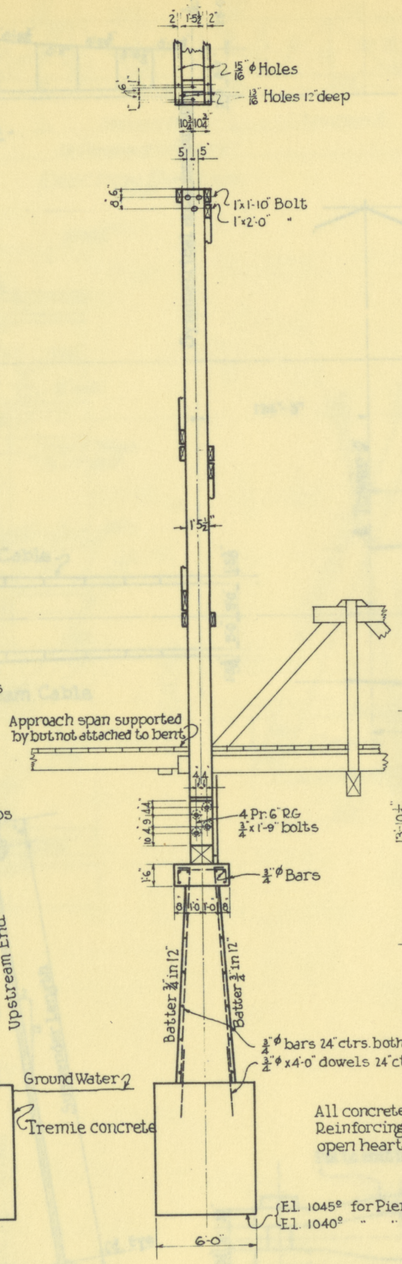
Revised Dec. 22-1933 by R.W.L. sheets 1 to 7 inc.
Revised 4-30-34 - Anchor Locations.

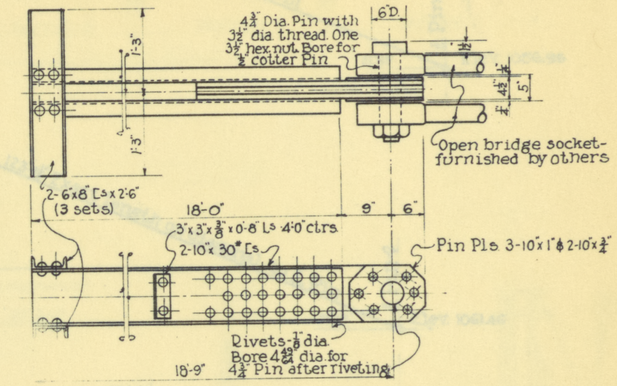
DESIGNED BY W.D.S. Nov. 1933
5-M-18



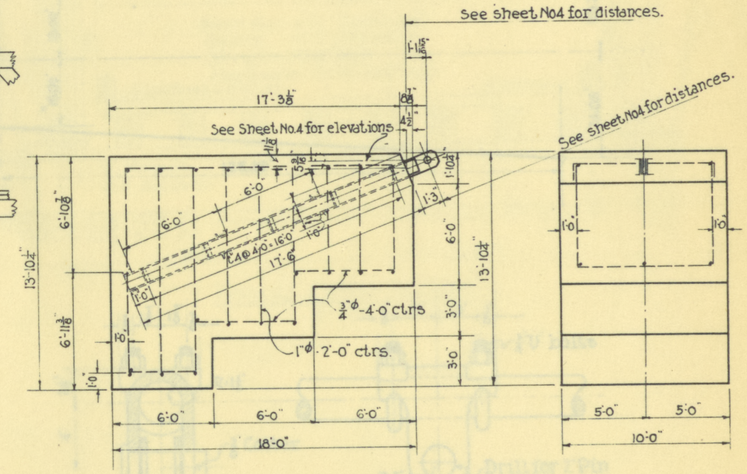
·ELEVATION·

·PLAN·





·DETAIL OF ANCHORAGE STEEL·
Scale 1"=1'-0"
4-Required



ANCHORAGE BLOCK
1"=1'-0"

NOTES: All posts to be Common Structural grade (P 211, W.C.L.A. grading rules.) Caps & sills to be " " Stringer grade (P 220 W.C.L.A. grading rules.) Bracing to be Common Structural Joist grade (P 215 W.C.L.A. grading rules.) In addition all timber shall be side cut, no boxed heart will be allowed.

It is intended that the timber for the towers shall follow in all respects the specifications for the stiffening trusses as regards, seasoning, checking, fabricating and creosoting, except the timber for the towers will not be assembled.

Timber to be framed and bored before creosoting. Holes for drift bolts to be ⅛" smaller than nominal dia., for bolts ⅛" larger than dia.

All bracing to be bolted as shown and to be spiked as indicated with ⅜"x8" boat spikes. Holes for spikes to be ⅜" dia. and bored in braces only.

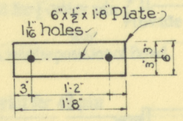
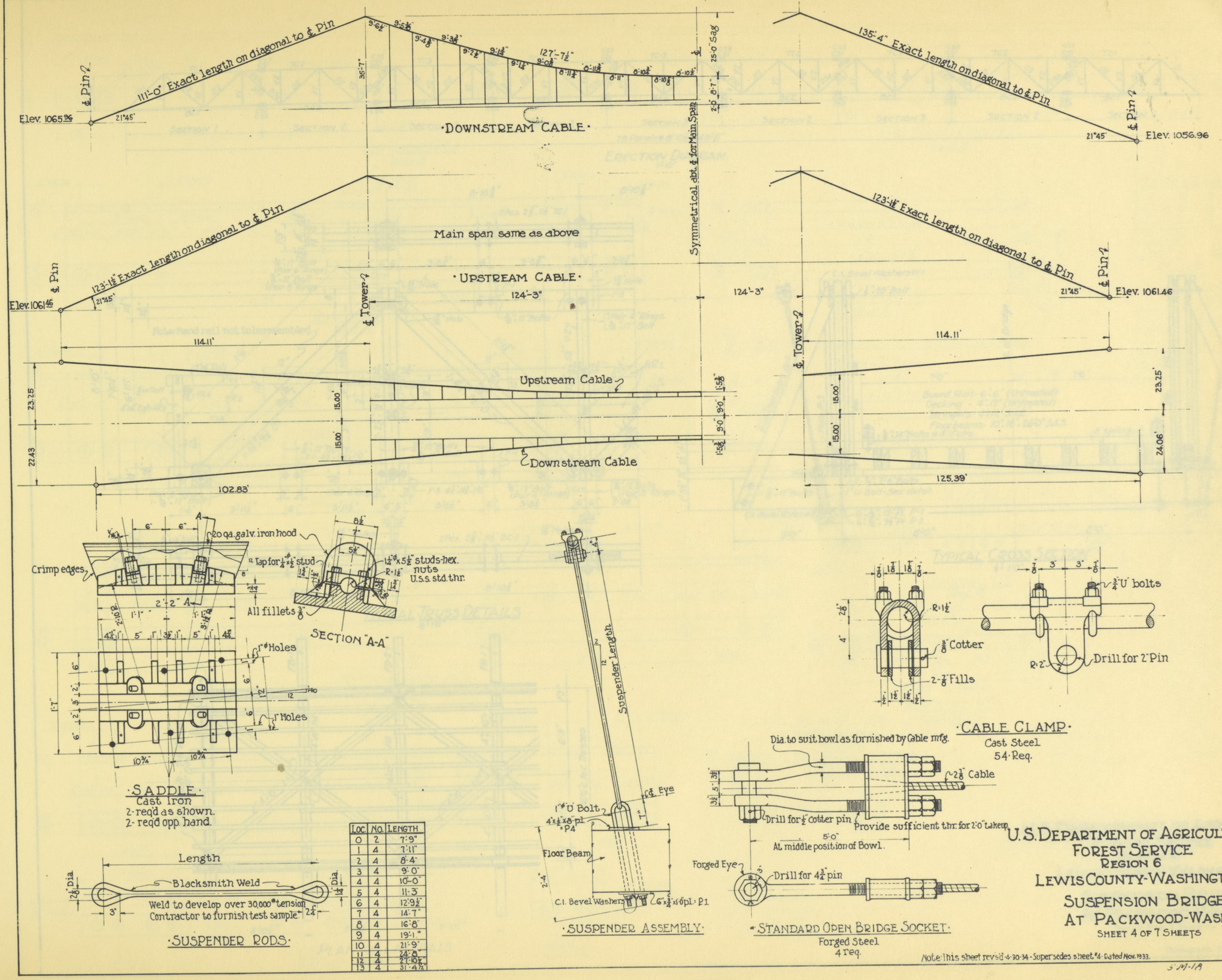


PLATE P-F
Make 4

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
LEWIS COUNTY WASHINGTON
SUSPENSION BRIDGE
AT PACKWOOD WASH.
SHEET 2 OF 7 SHEETS

Supersedes sheets 2 & 3 REVISED BY R.W.L.-1-10-33

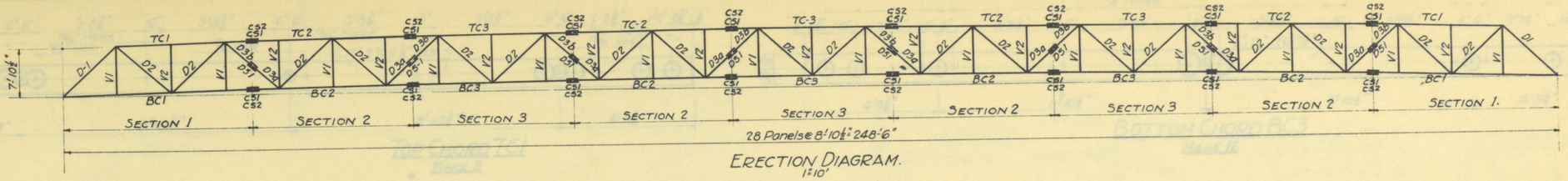


Loc.	No.	Length
0	2	7'-9"
1	4	7'-11"
2	4	8'-4"
3	4	9'-0"
4	4	10'-0"
5	4	11'-3"
6	4	12'-9½"
7	4	14'-7"
8	4	16'-8"
9	4	19'-1"
10	4	21'-9"
11	4	24'-8"
12	4	27'-10½"
13	4	31'-4½"

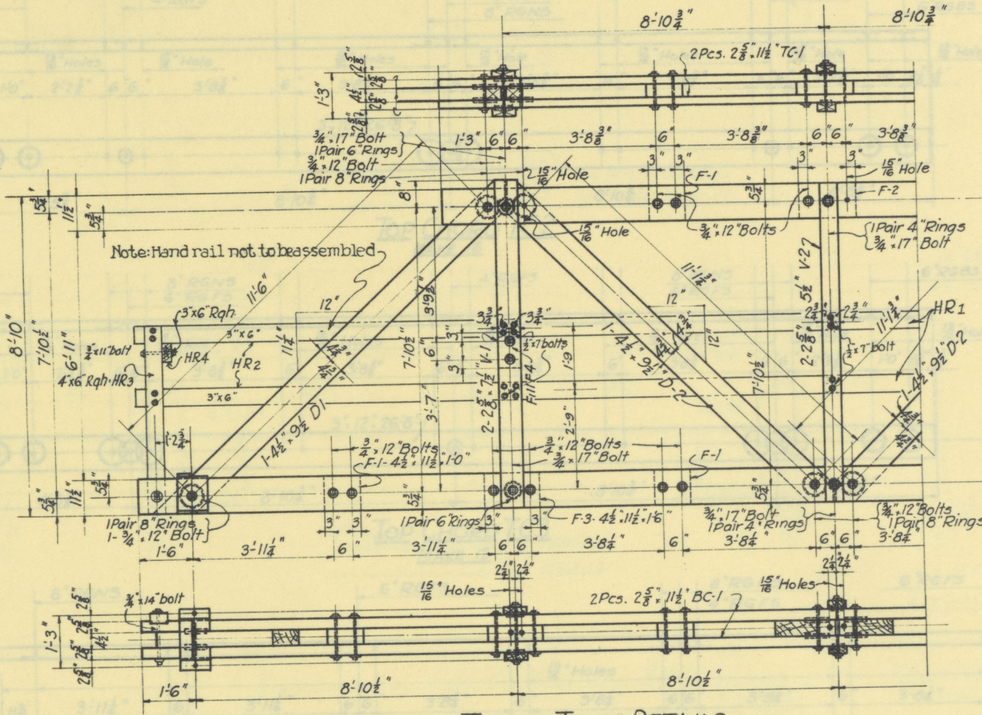
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
LEWIS COUNTY-WASHINGTON
SUSPENSION BRIDGE
AT PACKWOOD-WASH.
SHEET 4 OF 7 SHEETS

Note: This sheet revsd 4-30-34 - Supersedes sheet #4 - Dated Nov. 1933.

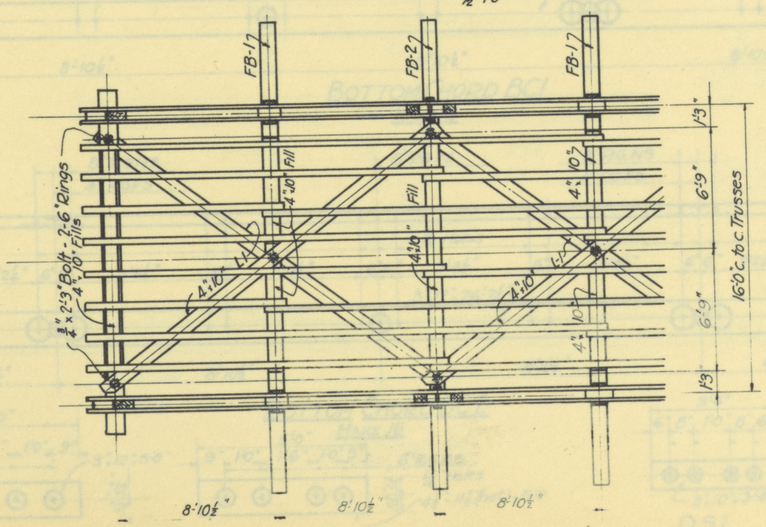
3-M-19



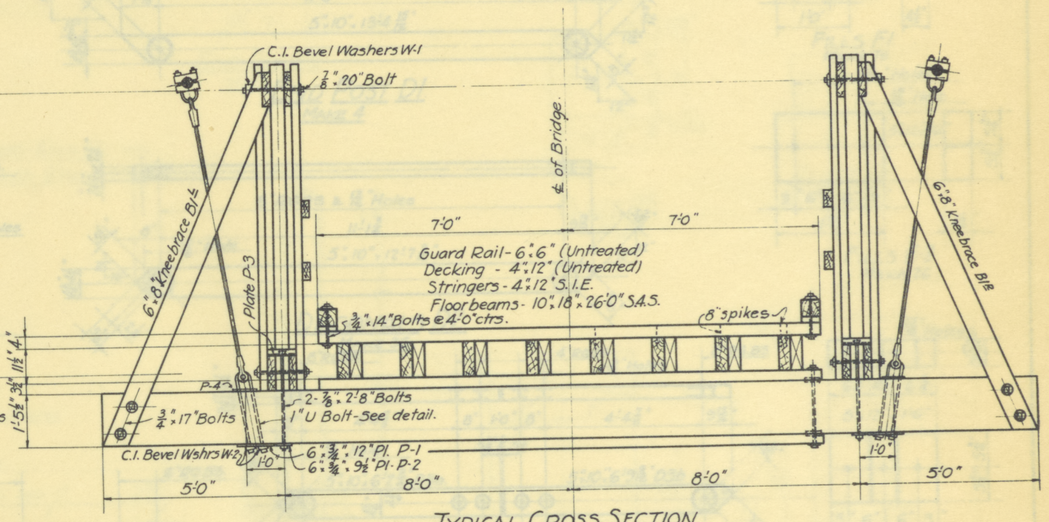
ERECTION DIAGRAM.
1"=10'



TYPICAL TRUSS DETAILS
½"=1'0"



PLAN OF LATERALS
Scale ¼"=1'0"



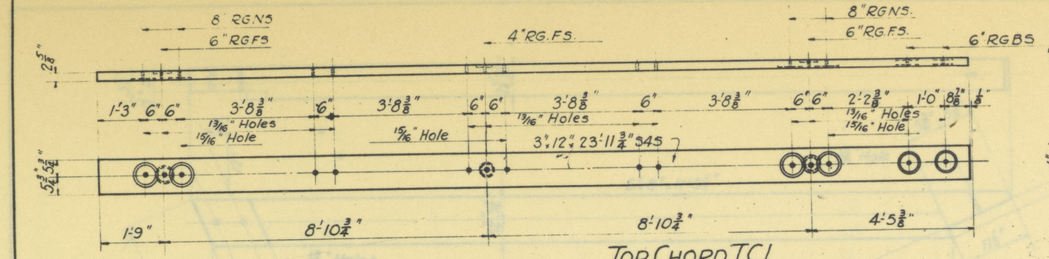
TYPICAL CROSS SECTION
½"=1'0"

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
LEWIS COUNTY-WASHINGTON

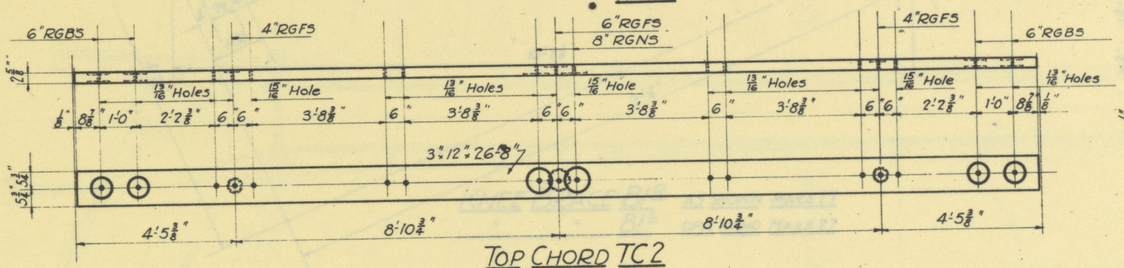
SUSPENSION BRIDGE AT PACKWOOD-WASH.

SHEET 5 OF 7 SHEETS

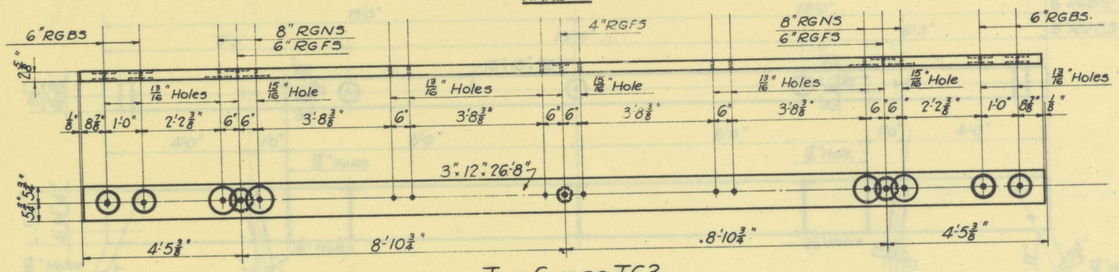
DESIGNED BY W.D.S. Nov. 1933



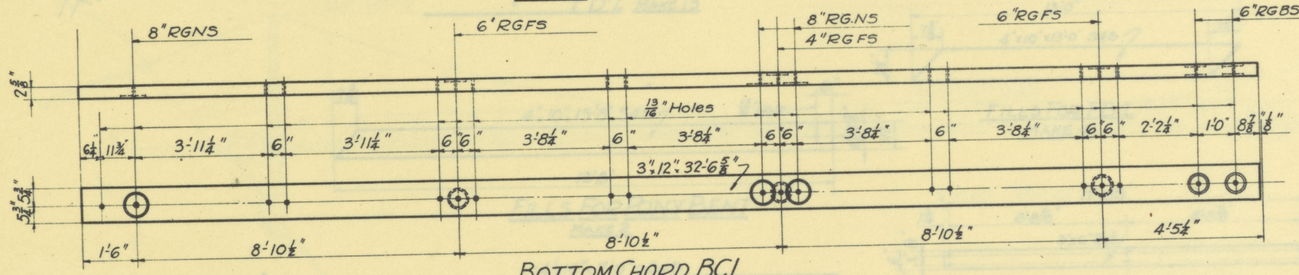
TOP CHORD TC1
MAKE 8



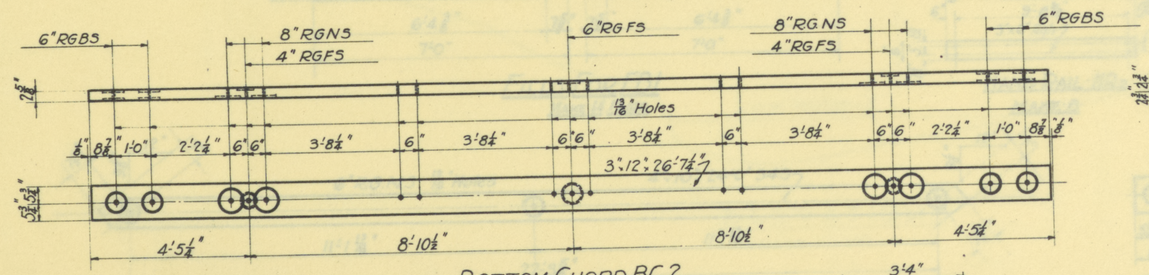
TOP CHORD TC2
MAKE 16



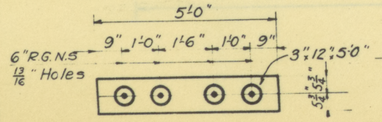
TOP CHORD TC3
MAKE 12



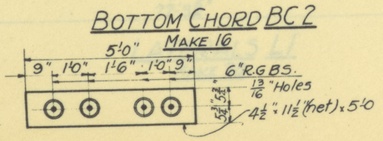
BOTTOM CHORD BC1
MAKE 8



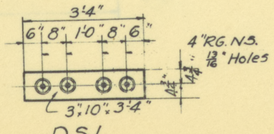
BOTTOM CHORD BC2
MAKE 16



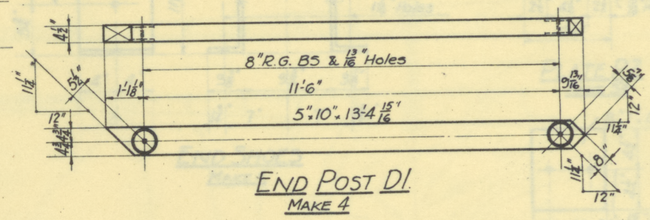
CS1
MAKE 64



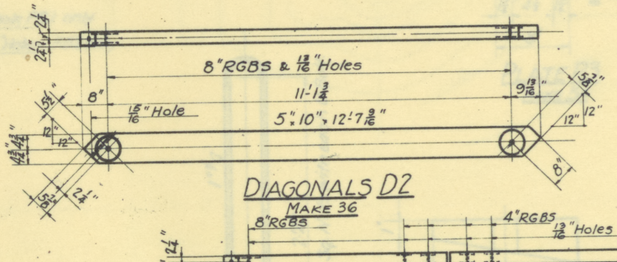
CS2
MAKE 32



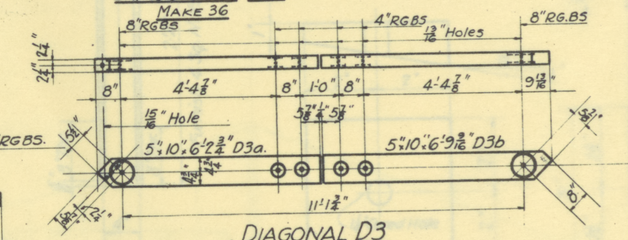
DS1
MAKE 32



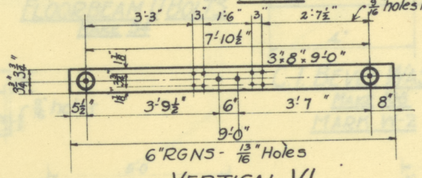
END POST D1
MAKE 4



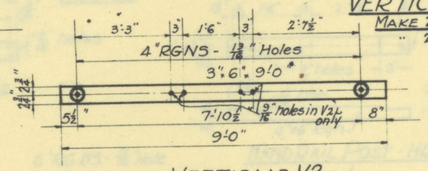
DIAGONALS D2
MAKE 36



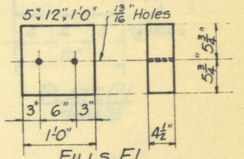
DIAGONAL D3
MAKE 16



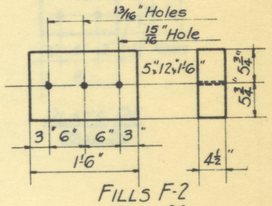
VERTICAL V1
MAKE 28 V1L
" 28 V1R



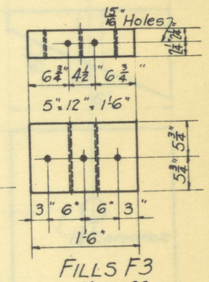
VERTICALS V2
MAKE 26 V2R
" 26 V2L



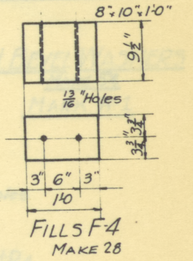
FILLS F1
MAKE 76



FILLS F2
MAKE 26



FILLS F3
MAKE 28



FILLS F4
MAKE 28

RG. = Ring Groove
NS = Near Side
FS = Far Side
BS = Both Sides

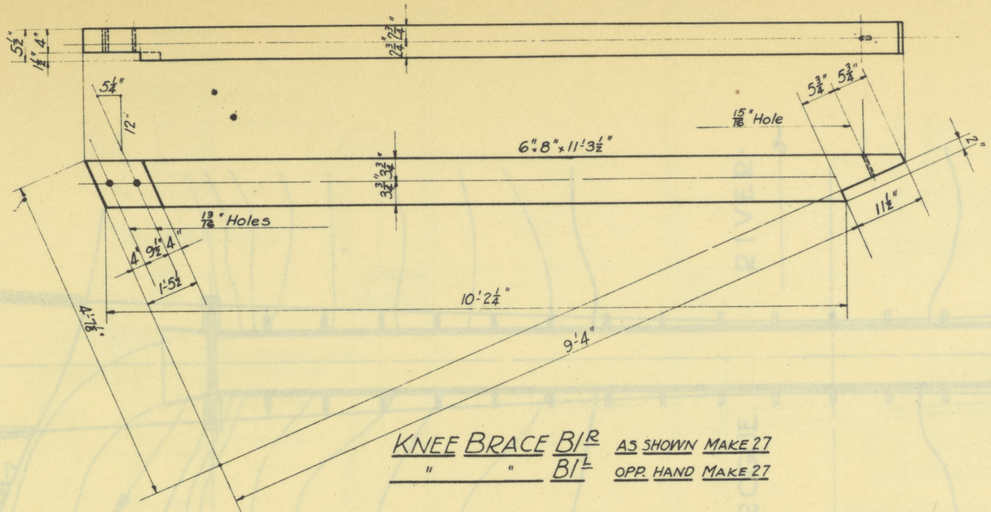
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
LEWIS COUNTY, WASHINTON.

SUSPENSION BRIDGE AT PACKWOOD, WASH.

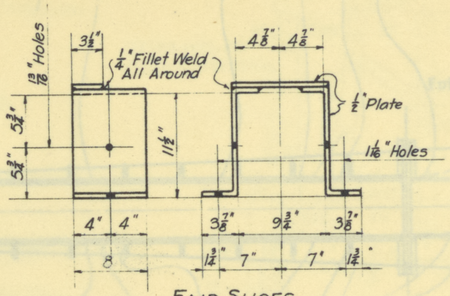
SHEET 6 OF 7 SHEETS

DESIGNED BY W.D.S. - Nov. 1933.

F-M-18



KNEE BRACE B1R AS SHOWN MAKE 27
" " B1L OPP. HAND MAKE 27



END SHOES
MAKE 4

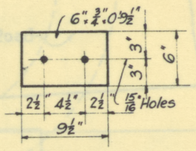


PLATE P2
MAKE 54

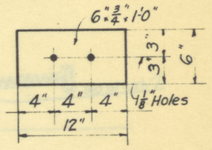


PLATE P1
MAKE 54

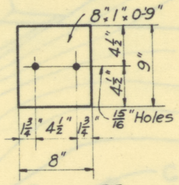


PLATE P3
MAKE 54

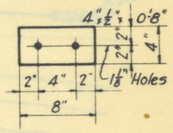
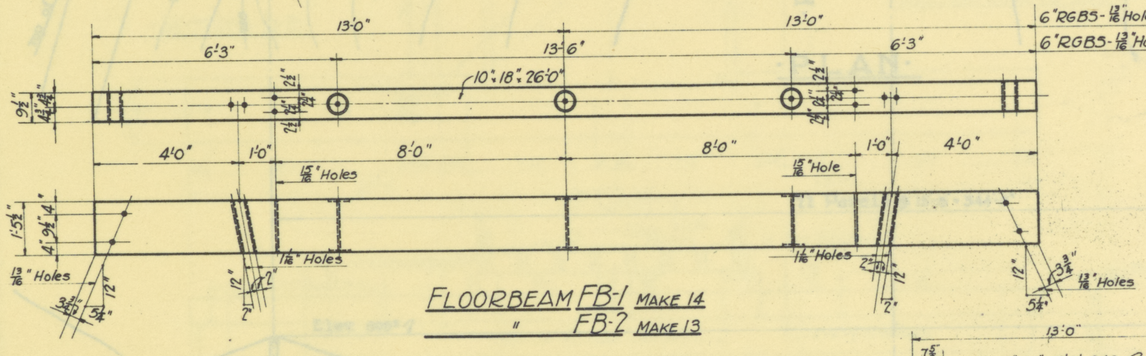
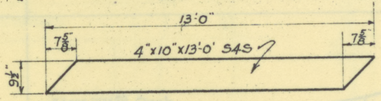


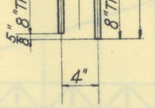
PLATE P4
MAKE 54



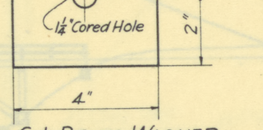
FLOORBEAM FB-1 MAKE 14
" FB-2 MAKE 13



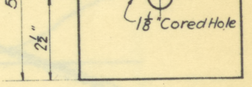
FILLS FOR FB2
MAKE-13



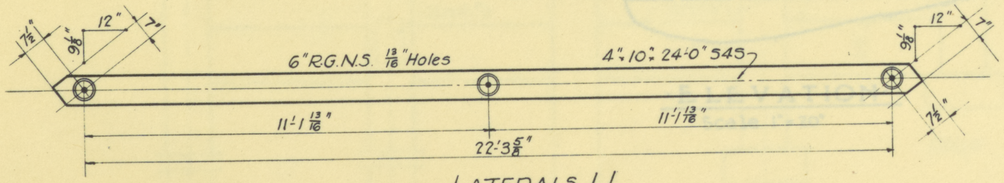
FLOORBEAM U BOLTS
MAKE 54



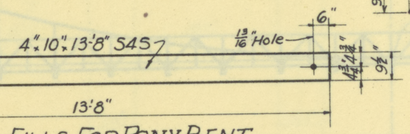
C.I. BEVEL WASHER
MAKE 108
MARK W-2



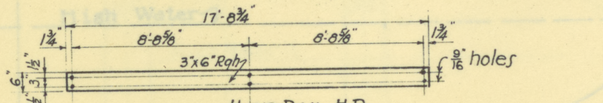
C.I. BEVEL WASHERS
MAKE 54
MARK W-1



FILLS FOR FB1
MAKE 14 PAIRS

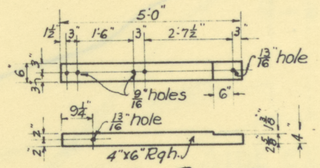


FILLS FOR PONY BENT
MAKE 2

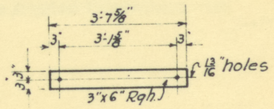


HAND RAIL H.R.1
MAKE 52

HAND RAIL-HR2
MAKE-8

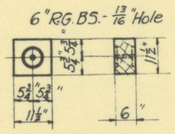


HAND RAIL POST - HR3
MAKE 4



HAND RAIL BRACE H.R.4
MAKE 4

LATERALS L1
MAKE 28

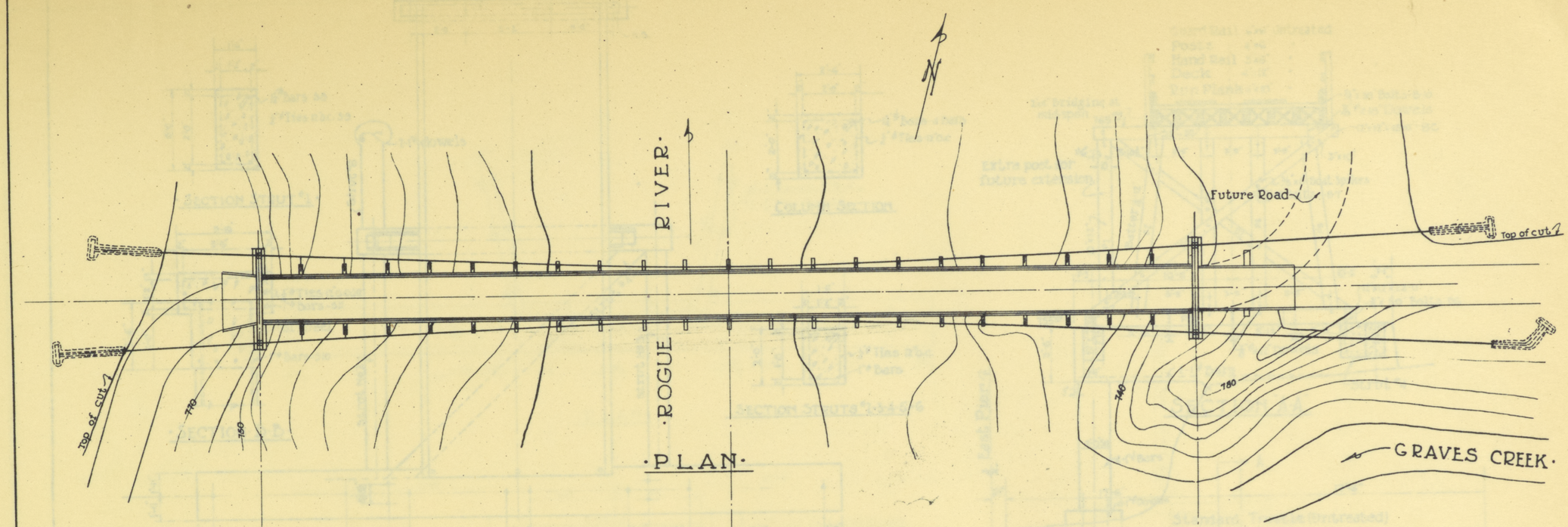


CAP FILLS
MAKE 2

R.G. = Ring Groove
NS = Near Side
FS = Far Side
BS = Both Sides

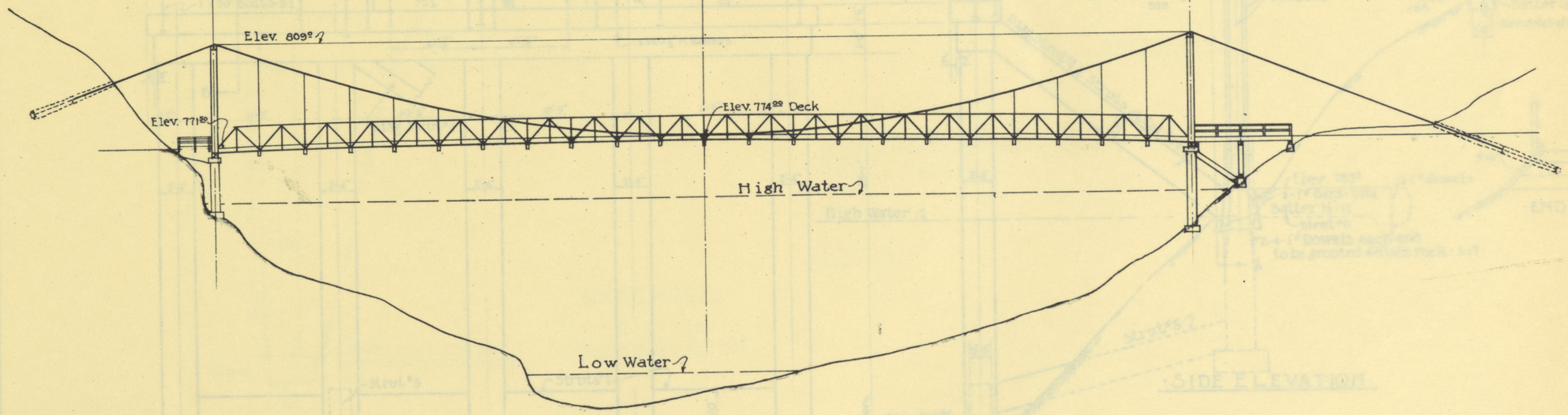
U.S. DEPARTMENT OF AGRICULTURE.
FOREST SERVICE
REGION 6
LEWIS COUNTY-WASHINGTON
SUSPENSION BRIDGE
AT PACKWOOD-WASH.
SHEET 7 OF 7 SHEETS

DESIGNED BY W.D.S. - Nov. 1933.



·PLAN·

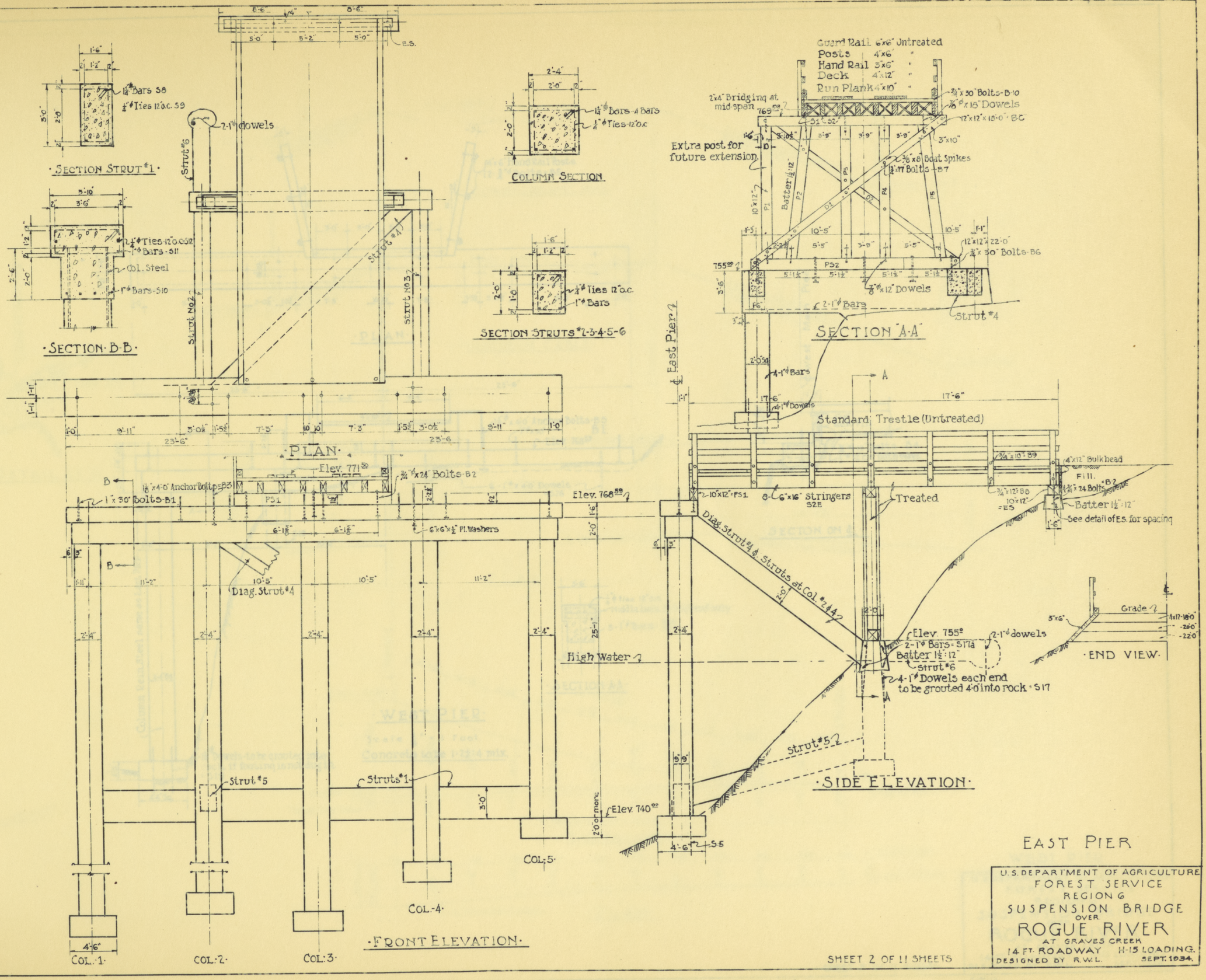
22 Panels @ 15'-8" = 344'-8"



·ELEVATION·
Scale 1" = 20'

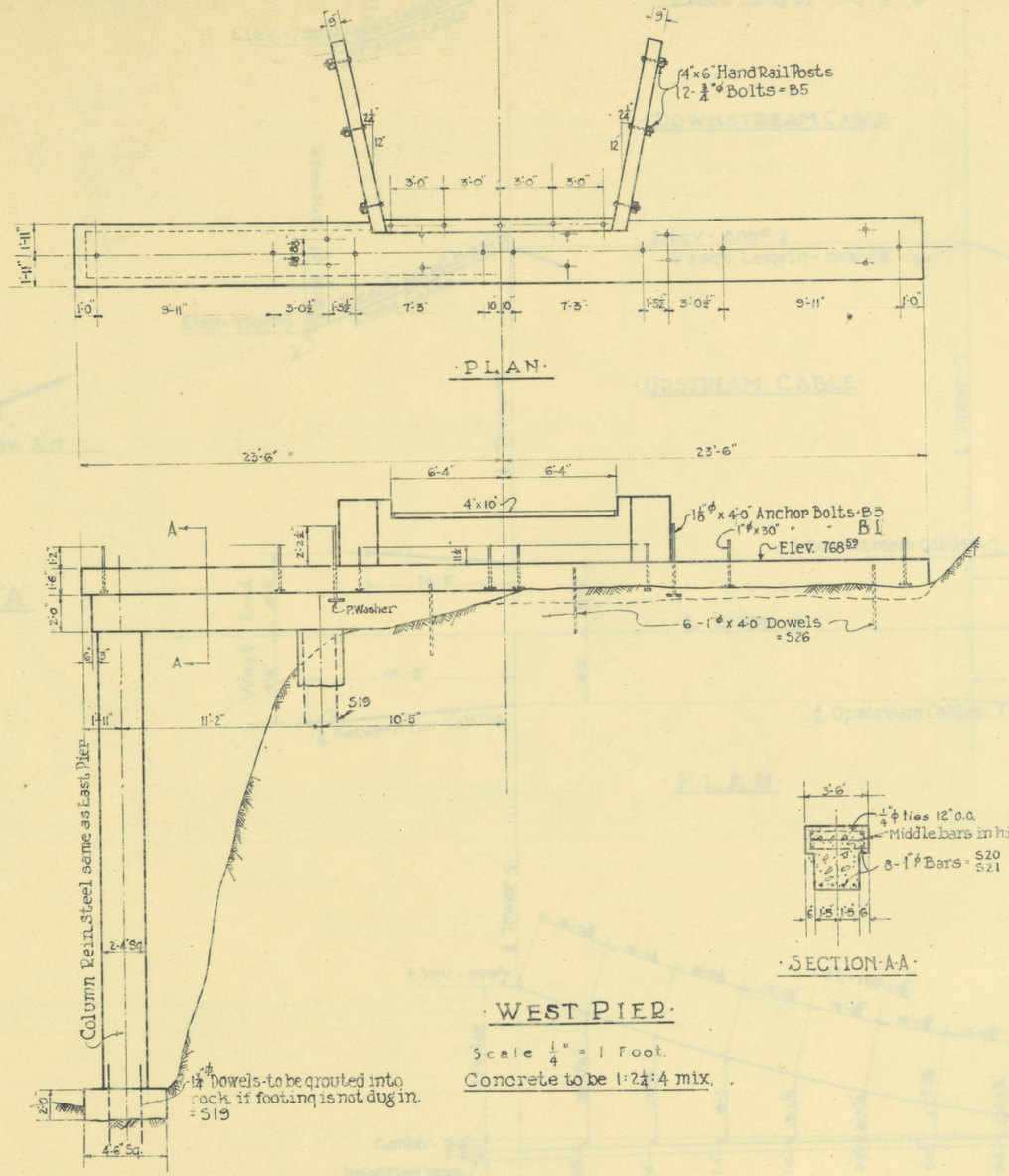
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT. ROADWAY, H-15 LOADING
DESIGNED BY R.W.L. SEPT., 1934.

SHEET 1 OF 11 SHEETS



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT. ROADWAY H-15 LOADING.
DESIGNED BY R.W.L. SEPT. 1934.

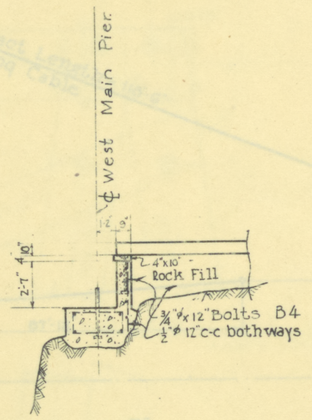
SHEET 2 OF 11 SHEETS



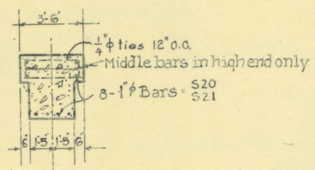
WEST PIER

Scale ¼" = 1 Foot.

Concrete to be 1:2½:4 mix.



SECTON ON ℄



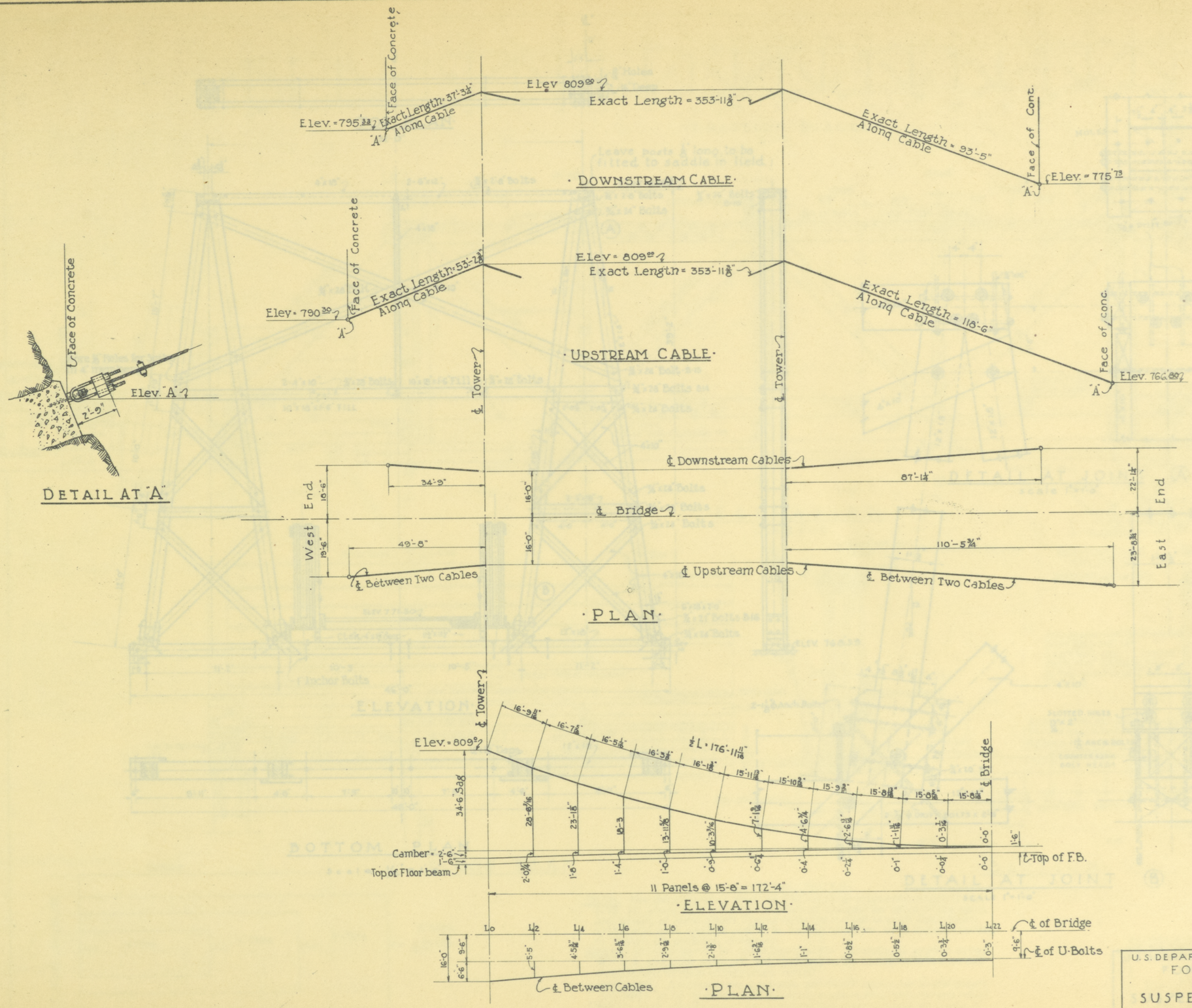
SECTION A-A

SHEET 3 OF 11 SHEETS

WEST PIER

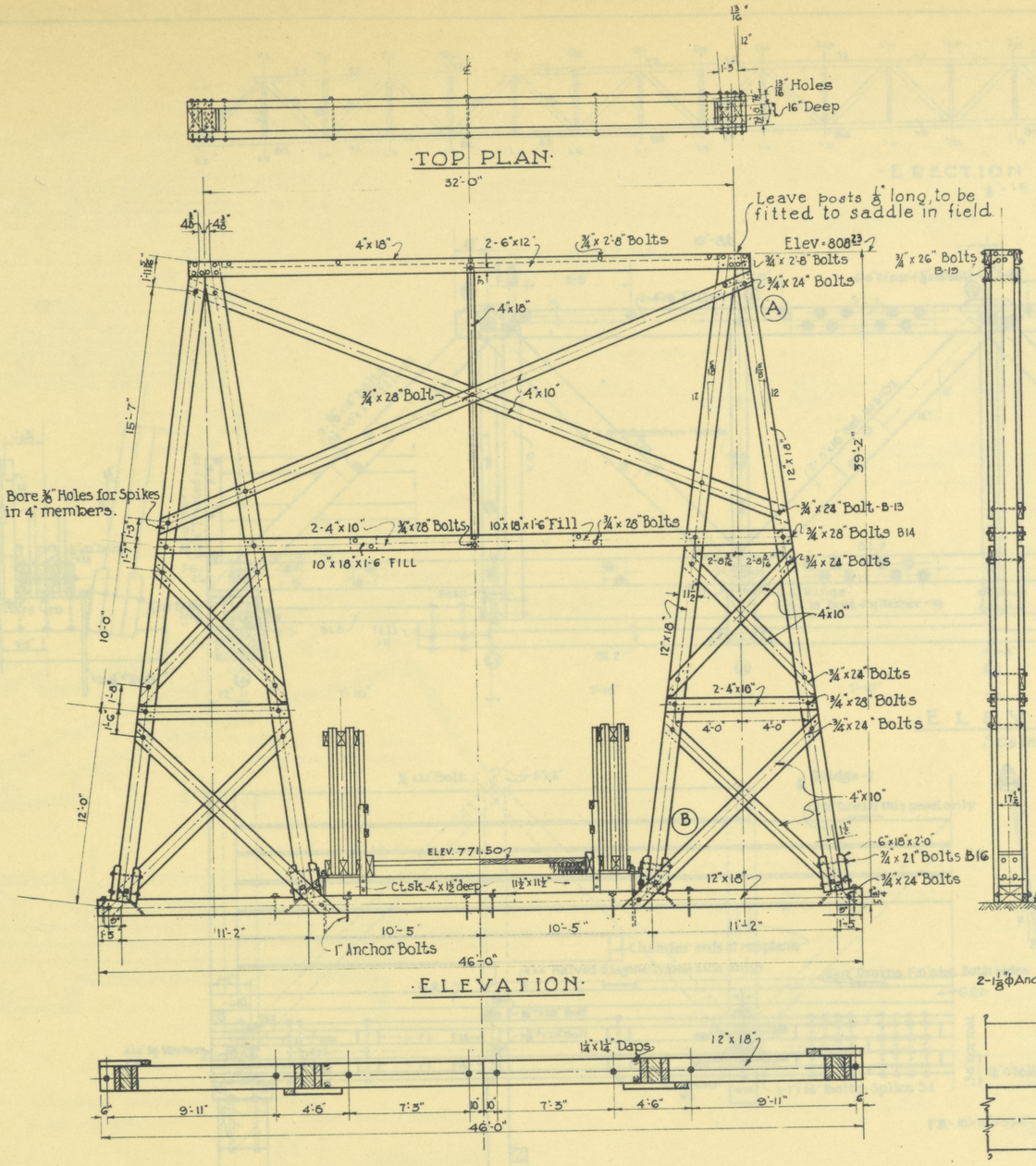
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT. ROADWAY H-15 LOADING
DESIGNED BY R.W.L. SEPT. 1934.

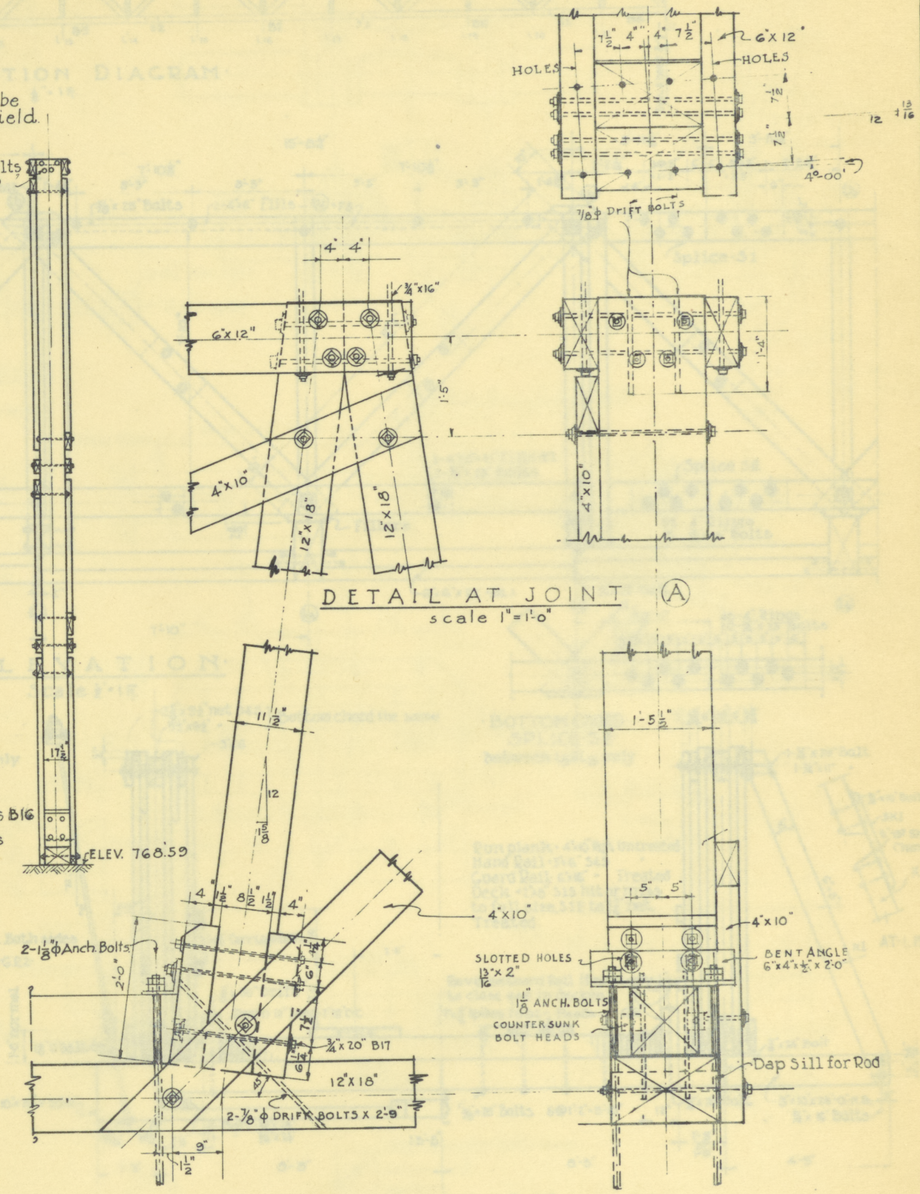
5-M-13



U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT. ROADWAY H-13 LOADING
DESIGNED BY R.W.L. SEPT. 1934

SHEET 4 OF 11 SHEETS

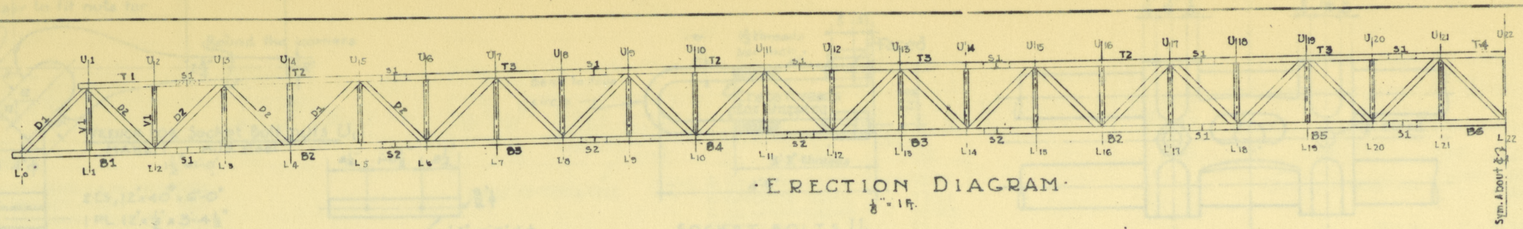




U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT. ROADWAY H-15 LOADING
DESIGNED BY R.W.L. SEPT. 1934

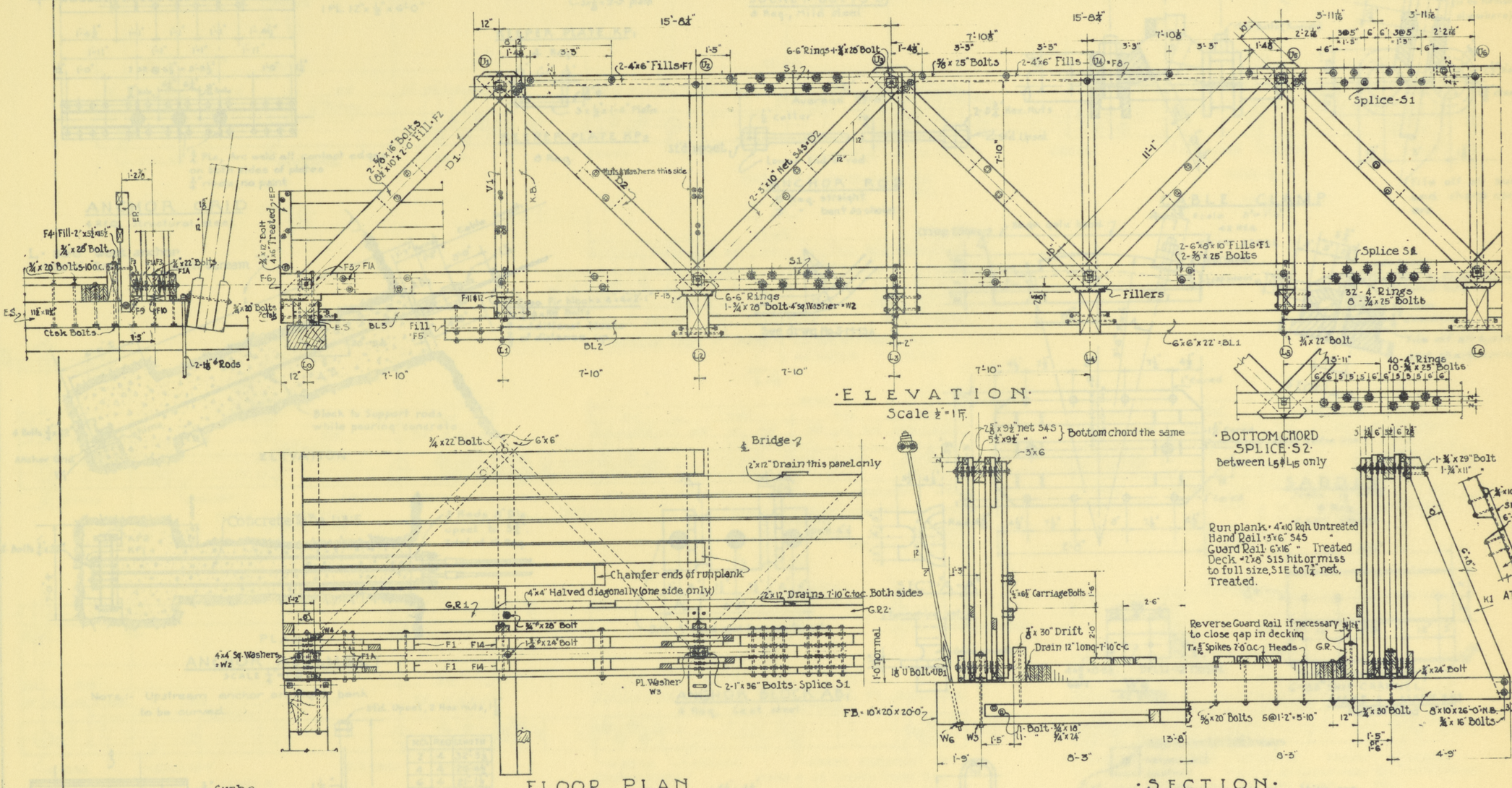
SHEET 5 OF 11 SHEETS

5-M-13



·ERECTION DIAGRAM·

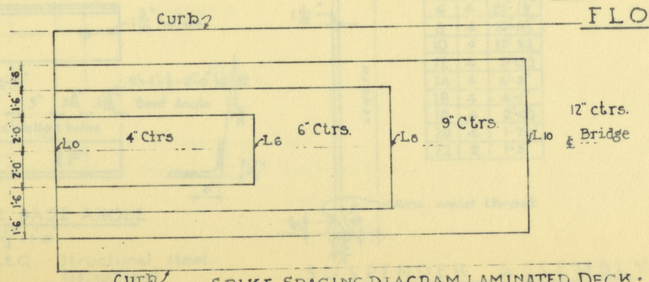
1/8" = 1 Ft.



·ELEVATION·

Scale ½" = 1 Ft.

·FLOOR PLAN·



·SPIKE SPACING DIAGRAM LAMINATED DECK·

·SECTION·

·GENERAL NOTES·

DECK: The deck lumber shall be 2"x8" S1S hit or miss and S1E to full size 2"x7¼". All joints to fall within one foot of the quarter point of the spans, and break at least 3 feet. Pieces to be toe-nailed to each floor-beam with 40d galv. spikes and to be nailed together with 50d galv. spikes as shown on spiking diagram.

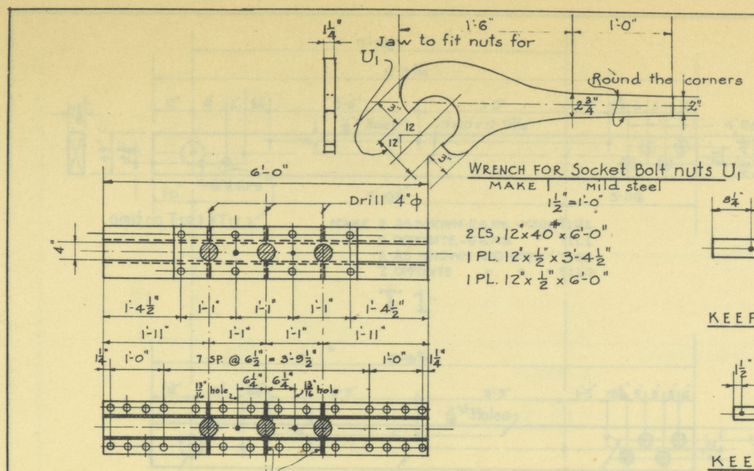
GRADE: All lumber to be coast Douglas fir structural grades as per W.C.L.A. and to be side cut. All lumber to be S1S1E to full size and creosoted unless otherwise noted.

HARDWARE: All machine, carriage and drift bolts, nails and square washers to be galvanized. Malleable washers on all bolts unless noted.

PAINT:- Give all the steel work except the main cables two coats of aluminum paint. Give hand rail one priming coat lead & oil and two coats of aluminum paint.

SHEET 6 OF 11 SHEETS

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT. ROADWAY H-15 LOADING
DESIGNED BY R.W.L. SEPT. 1934.



WRENCH FOR Socket Bolt nuts U_1

MAKE | Mild steel

1½" = 1'-0"

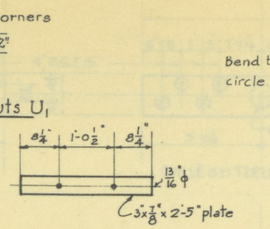
2 [S, 12"x40#x6'-0"

1 PL. 12"x½"x3'-4½"

1 PL. 12"x½"x6'-0"

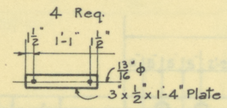
ANCHOR GRID

4 REQ., Structural steel.



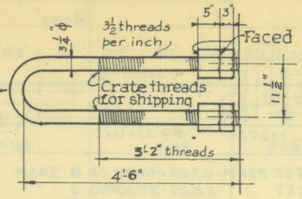
KEEPER PLATE KP_1

4 Req.



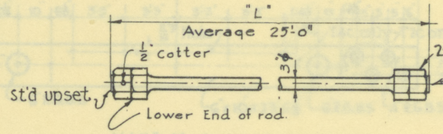
KEEPER PLATE KP_2

8 Req.



SOCKET BOLTS U_1

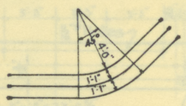
8 Req., Mild steel.

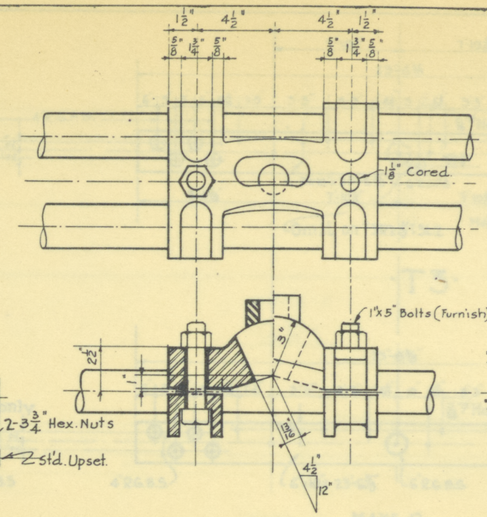


ANCHOR ROD

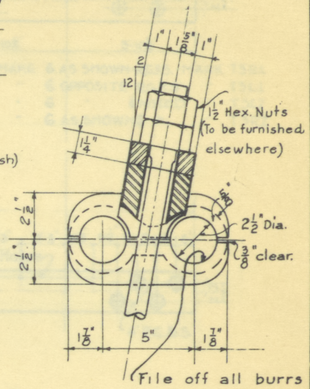
9 Req. straight

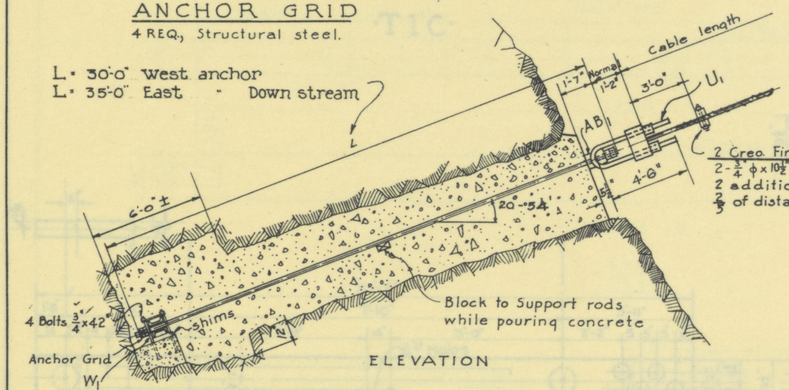
3 " bent as shown



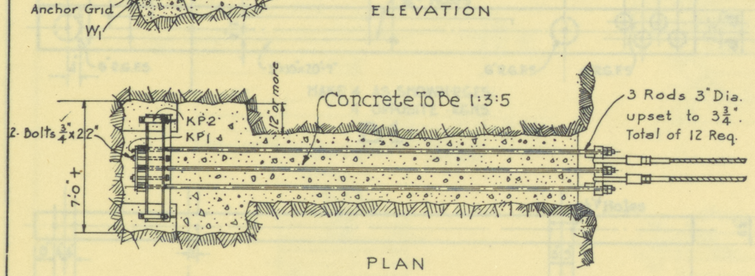


CABLE CLAMP





ELEVATION

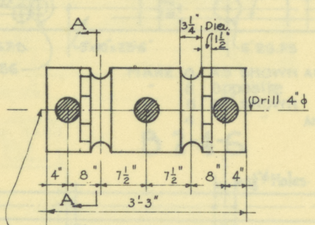


PLAN

ANCHOR ASSEMBLY

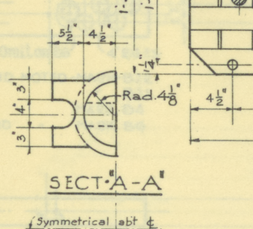
SCALE ¼" = 1'-0"

NOTE:- Upstream anchor on right bank to be curved.



ANCHOR BLOCK AB_1

4 Req., Cast steel



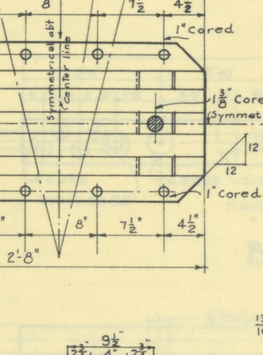
SADDLE

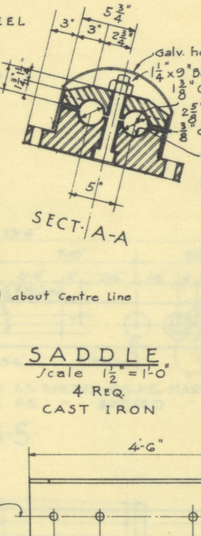
Scale 1½" = 1'-0"

4 Req.

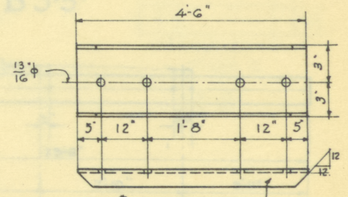
CAST IRON

SECT. "A-A"



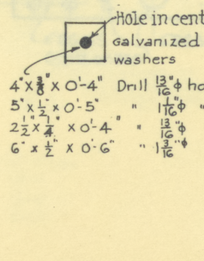


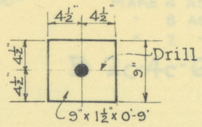
SECT. A-A



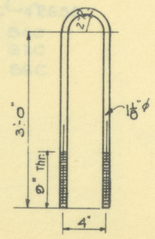
MAKE 4, MARK SK1

Galvanized





W1 - 12 Reqd.



UB1

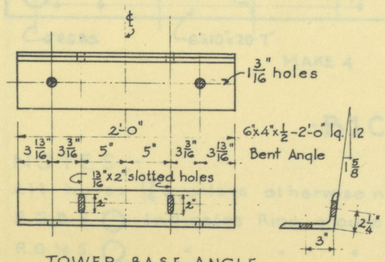
42 Reqd

4 Hex Nuts-each.

Hole in center both ways

Galvanized washers

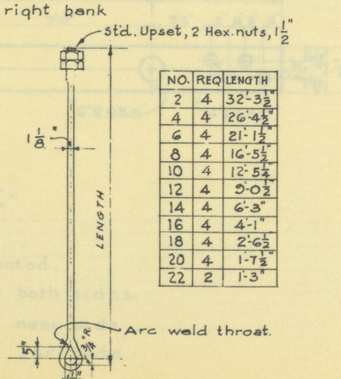
4"x⅜"x0'-4"	Drill 13/16"ϕ holes	Mk. W2	Make 200
5"x½"x0'-5"	" 1 13/16"ϕ "	" W3	" 185
2½"x¼"x0'-4"	" 13/16"ϕ "	" W4	" 8
6"x½"x0'-6"	" 1 13/16"ϕ "	" W5	" 8 not. galv.



TOWER BASE ANGLE

1½" = 1'-0"

4 REQ. Structural steel. Galvanized



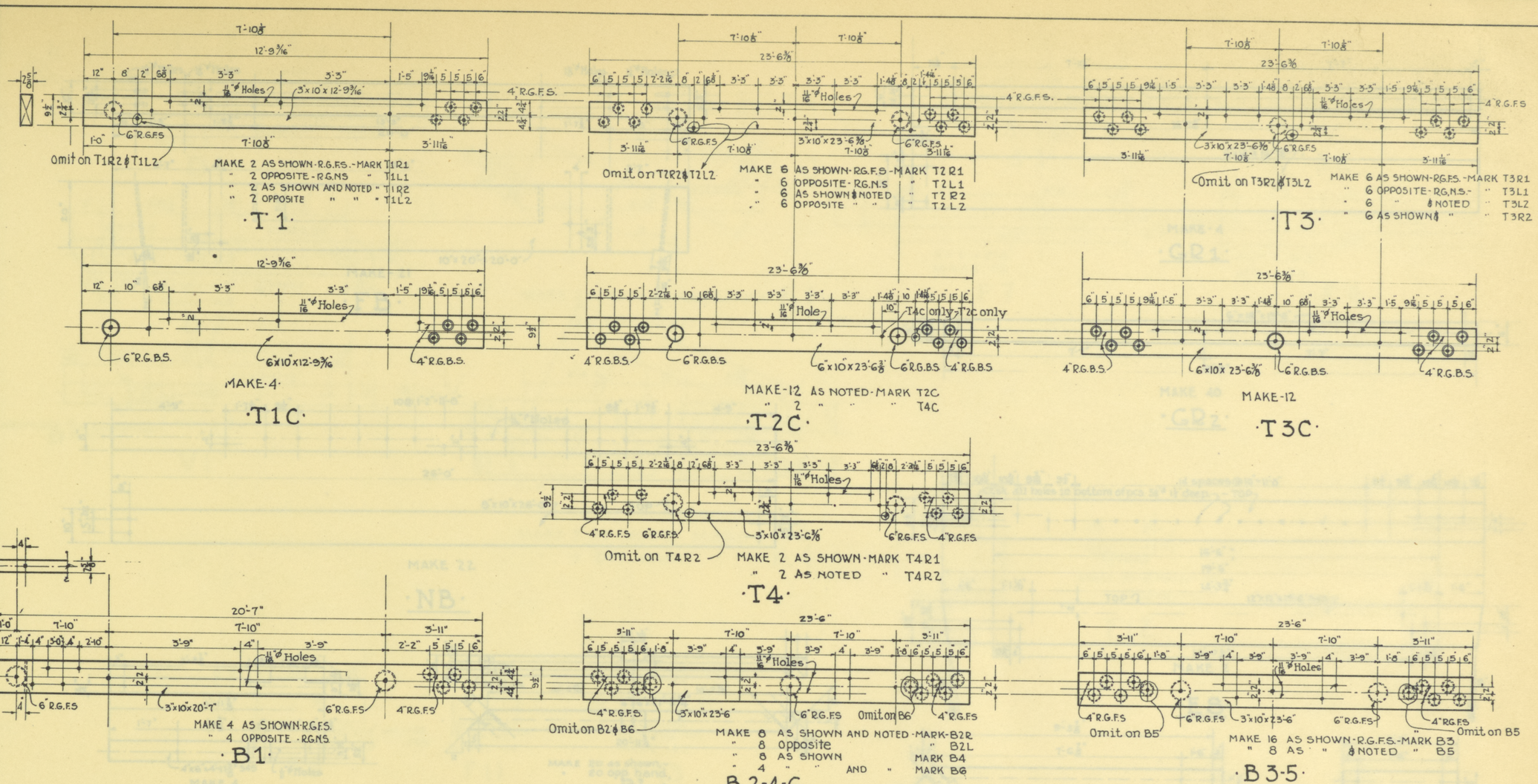
NO.	REQ	LENGTH
2	4	32'-3½"
4	4	26'-4½"
6	4	21'-1½"
8	4	16'-5½"
10	4	12'-5¼"
12	4	9'-0½"
14	4	6'-3"
16	4	4'-1"
18	4	2'-6½"
20	4	1'-7½"
22	2	1'-3"

SUSPENDER ASSEMBLY

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK.
14 FT. ROADWAY H-15 LOADING.
DESIGNED BY R.W.L. SEPT. 1934.

SHEET 7 OF 11 SHEETS

5-M-13



NOTES :-

All holes 13/16" ϕ, unless otherwise noted.

R.G.B.S. ○ Indicates Ring groove both sides.

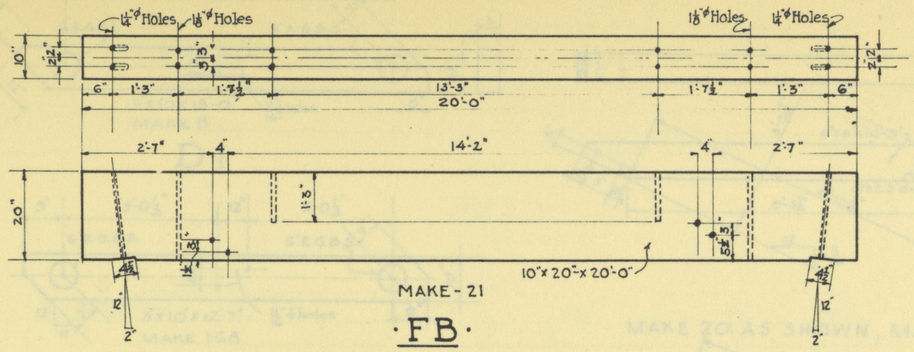
R.G.N.S. ○ " " " near side.

R.G.F.S. ◌ " " " far side.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT. ROADWAY H-13 LOADING
DESIGNED BY R.W.L. SEPT. 1934.

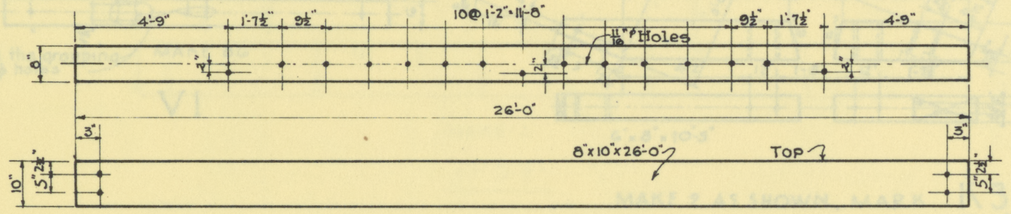
SHEET 8 OF 11 SHEETS

5-M-13



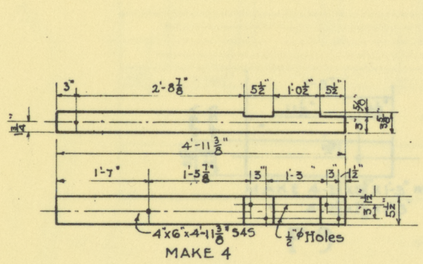
MAKE - 21

·FB·



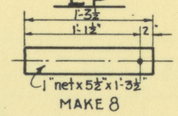
MAKE 22

·NB·



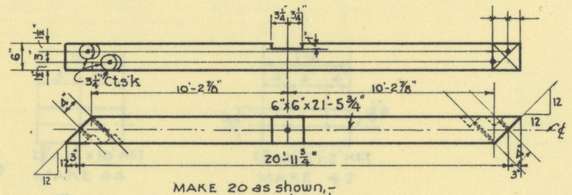
MAKE 4

·EP·



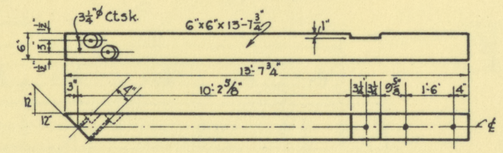
MAKE 8

·F4·



MAKE 20 as shown,
" 20 opp. hand,

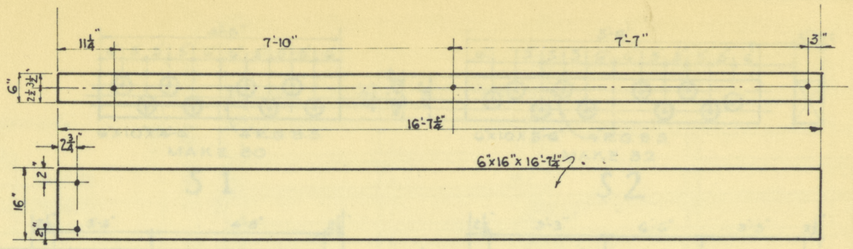
BL 1



·BL2·

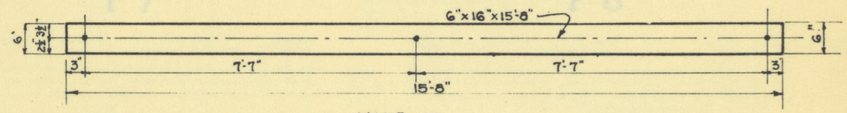
MAKE 2 AS SHOWN,

MAKE 2, OPP. HAND,



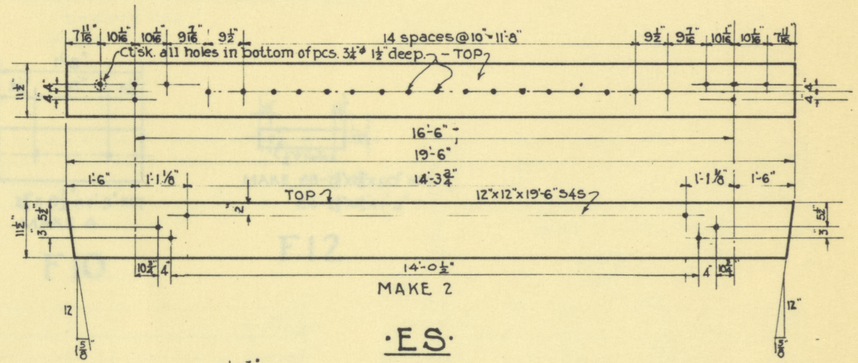
MAKE - 4

·GR 1·



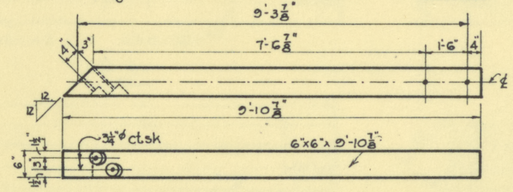
MAKE 40

·GR 2·



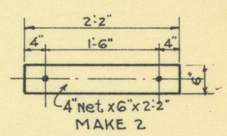
MAKE 2

·ES·



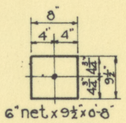
MAKE 2 AS SHOWN
" 2 OPP. HAND.

·BL 3·



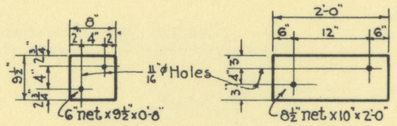
MAKE 2

·F5·



MAKE 88

·F14·

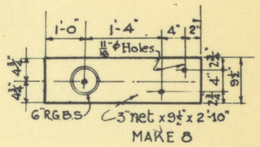


MAKE 120 AS SHOWN · F1
8 - 3"NET x 9½"x 8" · F1A WITH 13/16"ø HOLES

MAKE 88

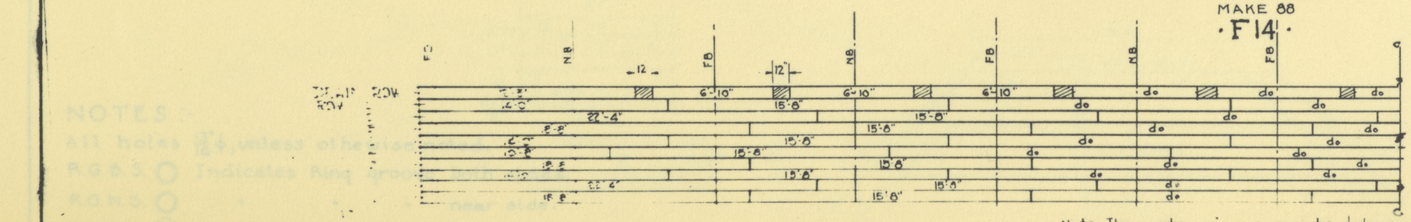
·F1·

·F2·



MAKE 8

·F3·



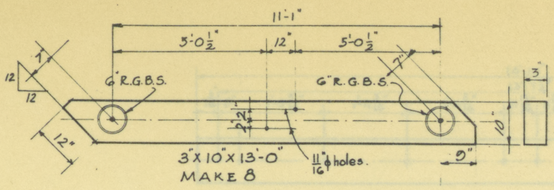
·DECK·

end with 18'-4" pcs.
" " 10'-0" "
" " 13'-8" "
" " 21-8 "

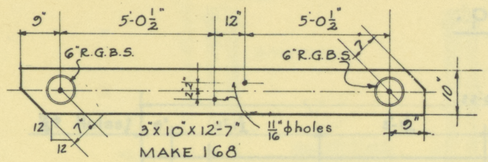
Note: The number of rows shall be determined by the net thickness of the pcs

SHEET 3 OF 11 SHEETS

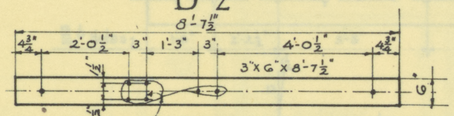
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT ROADWAY H-15 LOADING
DESIGNED BY R.W.L. SEPT 1934



D1

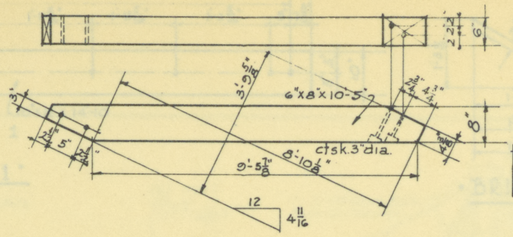


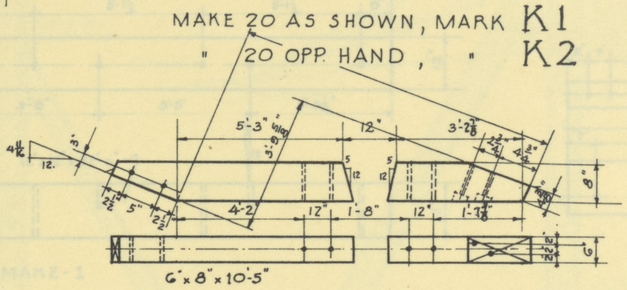
D2

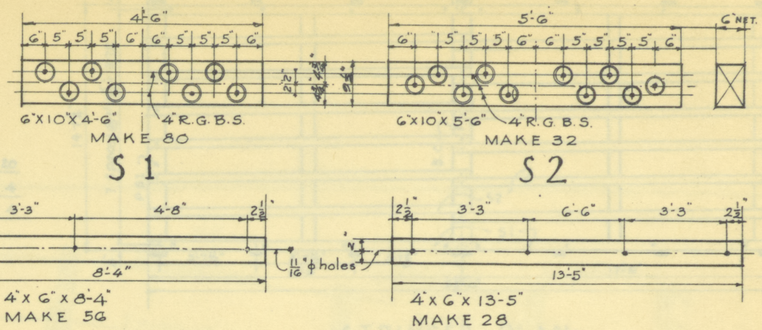


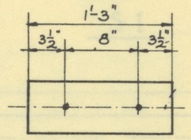
Alternate the grouping ½"ϕ holes

V1



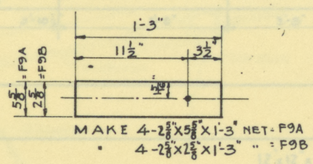




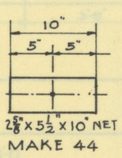


F10

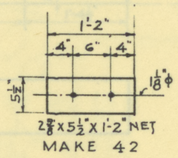
F12



F9



F11



F13

NOTES :-

All holes $\frac{13}{16}$"ϕ, unless othewise noted.

R.G.B.S. ○ Indicates Ring groove both sides.

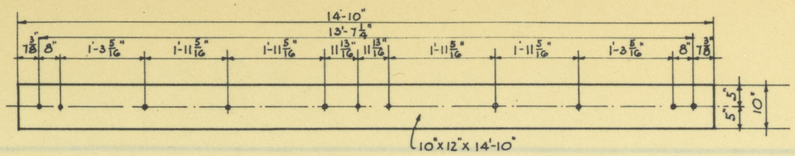
R.G.N.S. ○ " " " near side.

R.G.F.S. ◌ " " " far side.

SHEET 10 OF 11 SHEETS

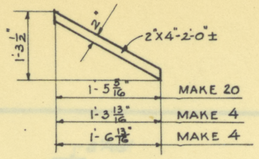
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
14 FT. ROADWAY H-15 LOADING
DESIGNED BY R.W.L. SEPT. 1934

S-M-13

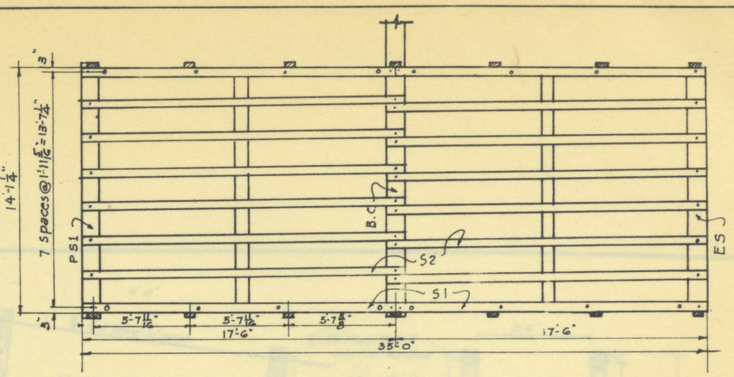


MAKE - 1

·PS 1·

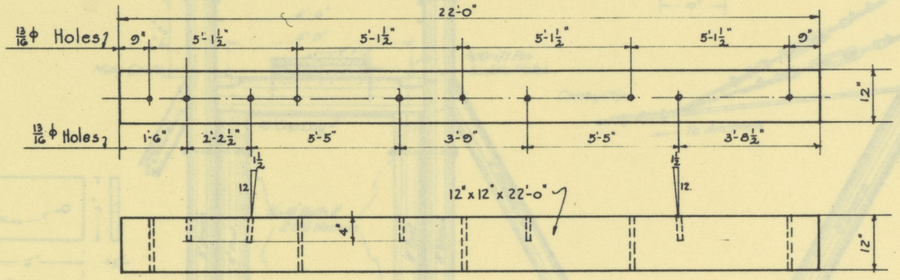


·BRIDGING·



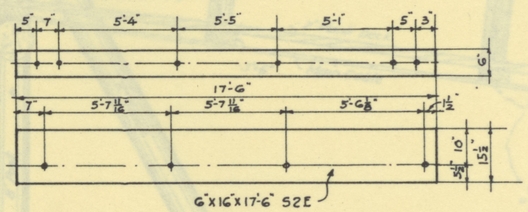
·STRINGER·PLAN·

1/4" = 1'-0"



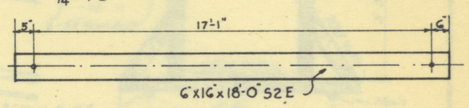
MAKE-1

·PS 2·



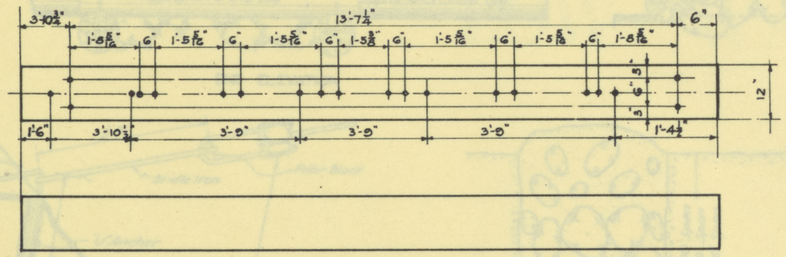
MAKE 4

S1



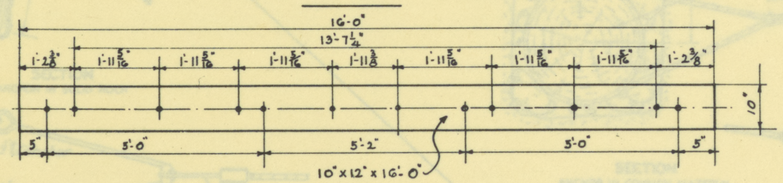
MAKE 12

S2



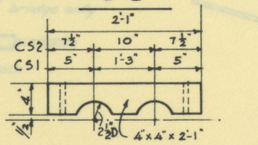
MAKE 1

·BC·



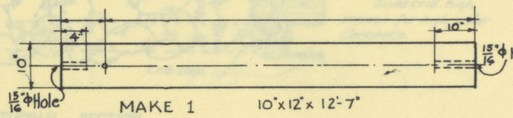
MAKE 1

·ES·

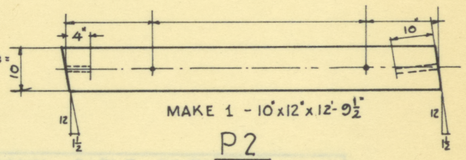


MAKE 8 - MK. CS1.
" 8 - " CS2

·CABLE SEPARATORS·



P1



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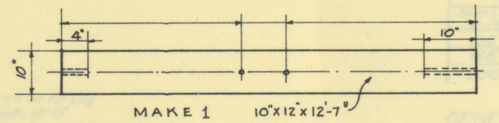
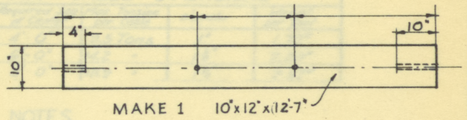


·P3·



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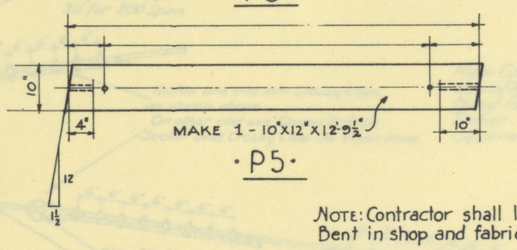
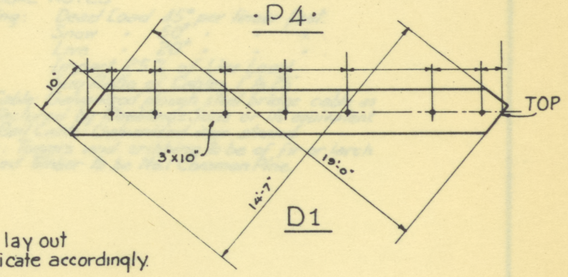
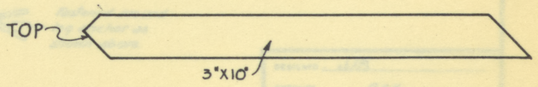


·P5·

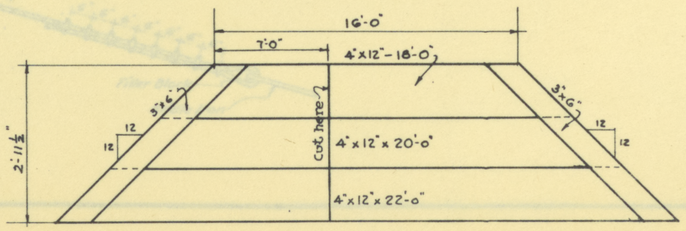


D1

NOTE: Contractor shall lay out Bent in shop and fabricate accordingly.



D2



BULKHEAD

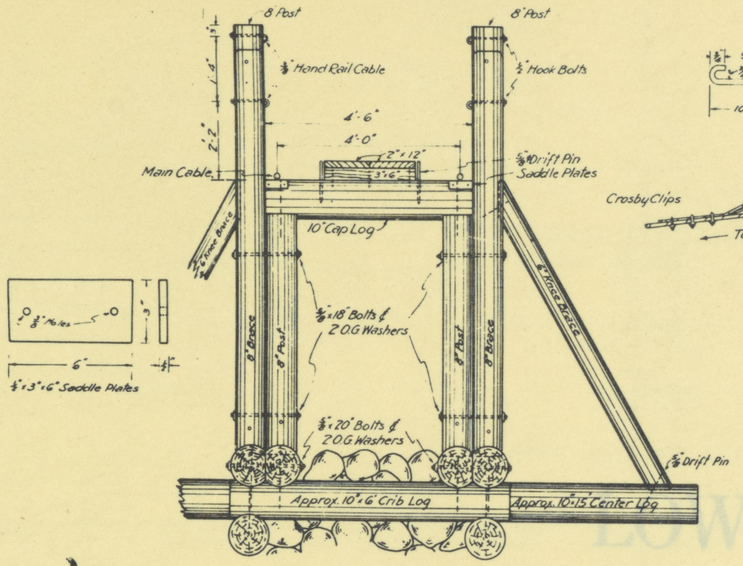
SHOP DETAILS - APPROACH SPAN

Note: All lumber to be SIZE hit or miss to full size unless otherwise noted. All holes to be 13/16 ϕ unless noted otherwise.

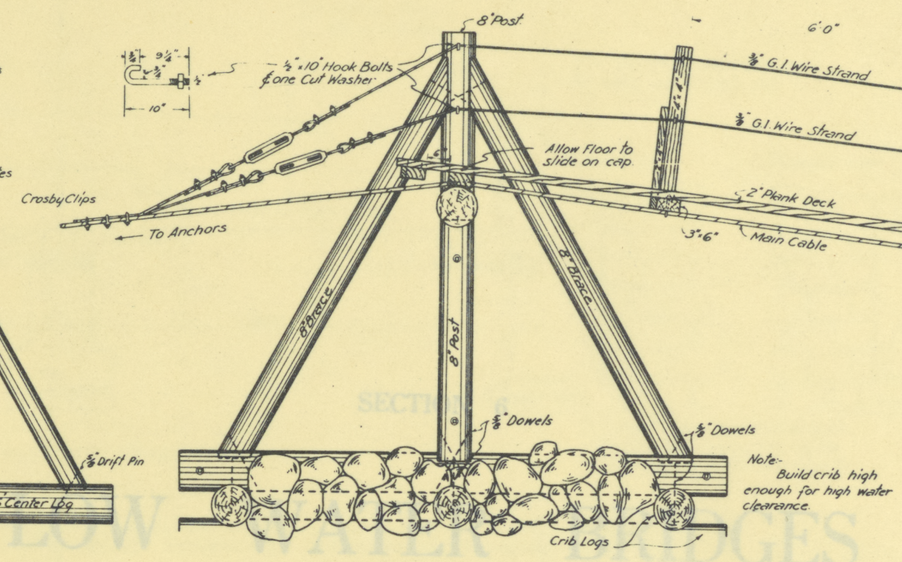
Revised 11-22-34.

SHEET 11 OF 11 SHEETS.

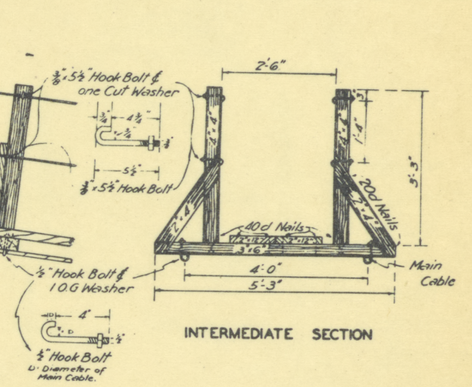
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6
SUSPENSION BRIDGE
OVER
ROGUE RIVER
AT GRAVES CREEK
BY R.W.L. H-13 NOV. 1934
5-M-13



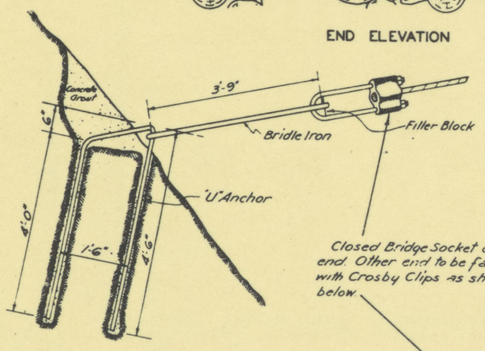
END ELEVATION



LONGITUDINAL SECTION

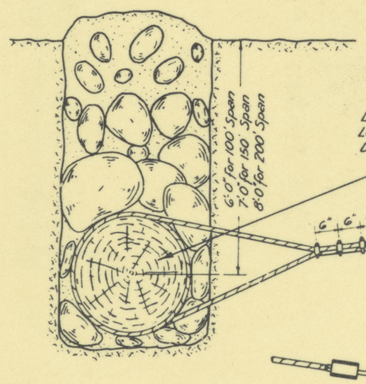


INTERMEDIATE SECTION



SECTION
ANCHOR IN SOLID ROCK

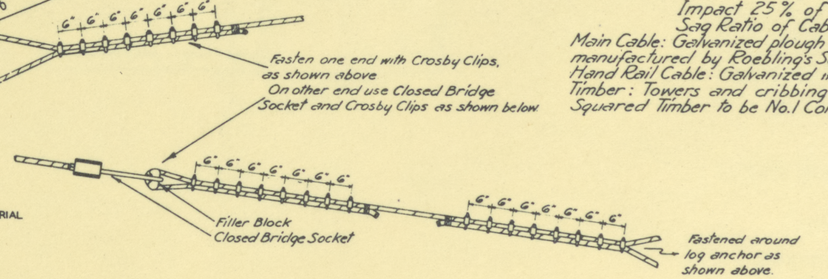
Closed Bridge Socket on one end. Other end to be fastened with Crosby Clips as shown below.

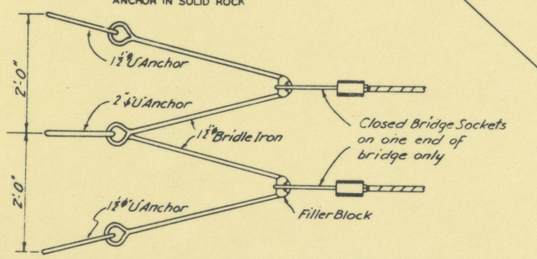


SECTION
ANCHOR IN COMMON MATERIAL

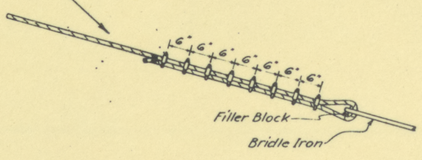
Larch or Fir Log
Length, 18'-0"
Diameter. 20" for 100' Span
25" for 150' Span
30" for 200' Span

Fasten one end with Crosby Clips, as shown above
On other end use Closed Bridge Socket and Crosby Clips as shown below





PLAN
ANCHOR IN SOLID ROCK



MAIN CABLE DIMENSIONS

Span Length in Feet	Required Sag at Center	Max. Tension per Cable	Diameter	Weight per Foot
100	4'-0"	9.5 Tons	1"	1.70#
150	6'-0"	14.2 "	1⅛"	2.20#
200	8'-0"	18.9 "	1¼"	2.57#

GENERAL NOTES

Loading: Dead Load 45# per linear foot.
Snow " 50# " " " "
Live " 20# " " " "
Impact 25% of Live Load.
Sag Ratio of Cables 1" to 25'
Main Cable: Galvanized plough steel bridge cable as manufactured by Roebling's Sons or its equivalent.
Hand Rail Cable: Galvanized iron strand.
Timber: Towers and cribbing to be of Fir or larch. Squared timber to be No.1 Common Pine.

DESIGNED JJB
CHECKED GEH
TRACED GEH
APPROVED Walter J. Theerman
Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO.1

TEMPORARY CABLE FOOT BRIDGE

100 TO 200 FOOT SPAN

SEPT. 1934. SCALE 3/16"=1'-0" SHEET 1 OF 1

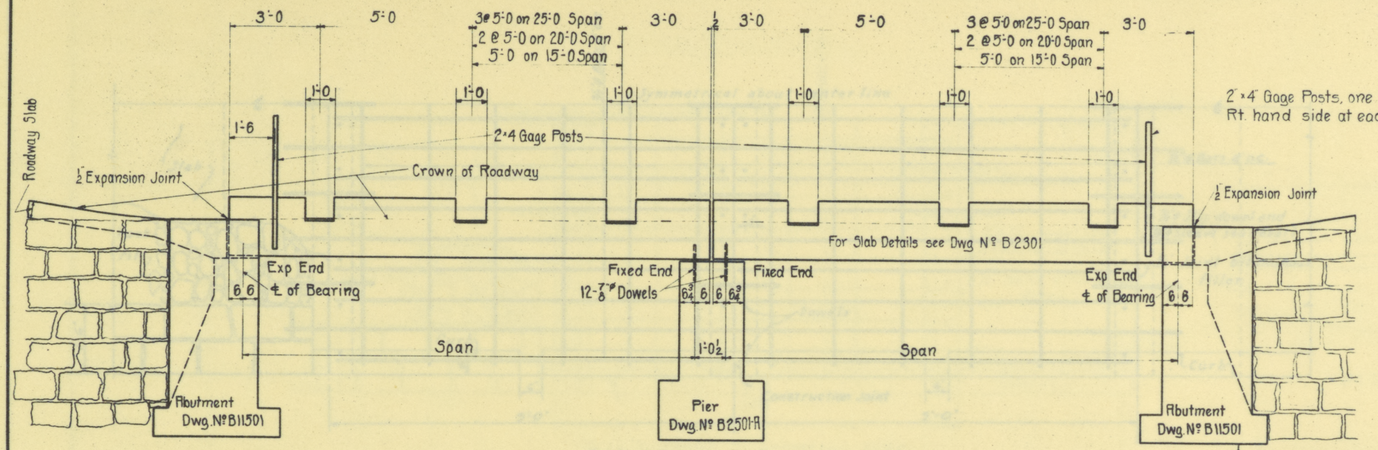
DR. NO. 71

LOW WATER BRIDGES

SECTION 6

LOW WATER BRIDGES

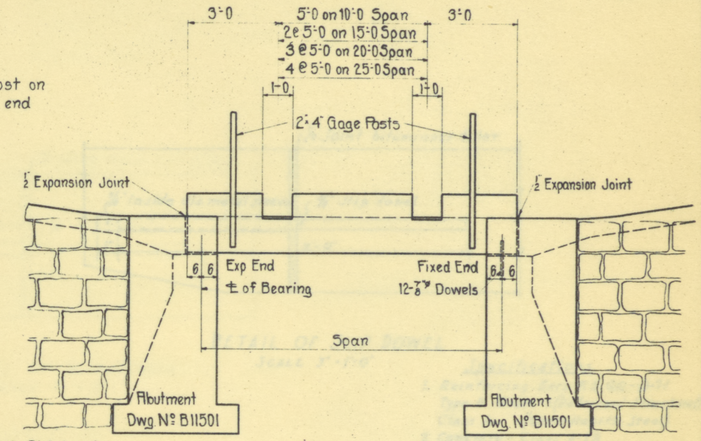
Drwg. N° B1301



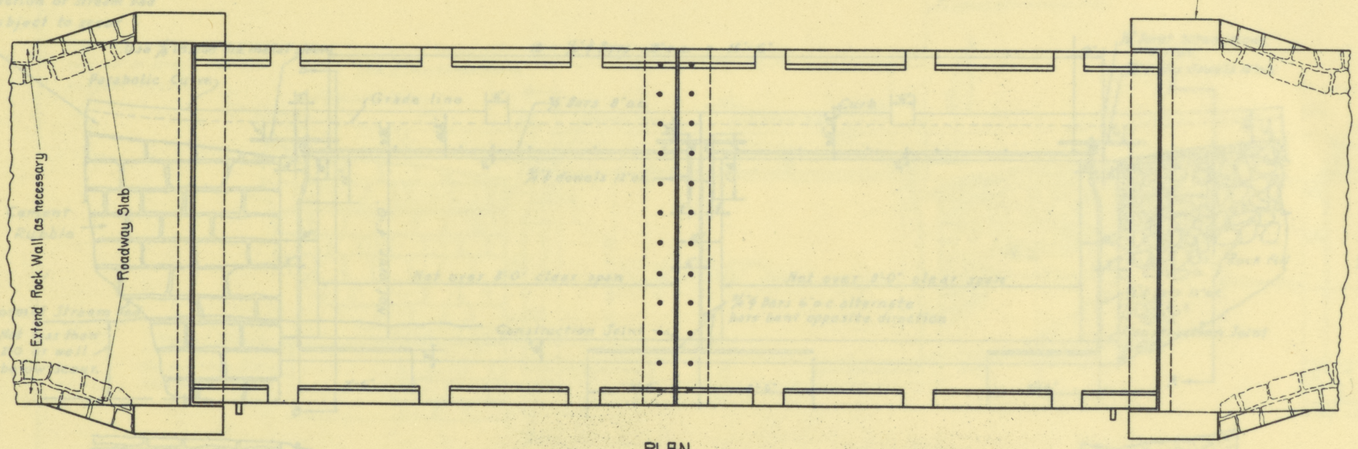
ELEVATION MULTIPLE SPANS

2"x4" Gage Posts, one post on Rt. hand side at each end

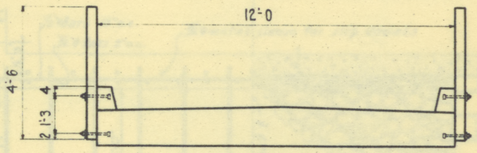
When Concrete Approach Slab is not required omit masonry wall and use Abutment Dwg. N° B680!, with wingwalls



ELEVATION SINGLE SPAN



PLAN

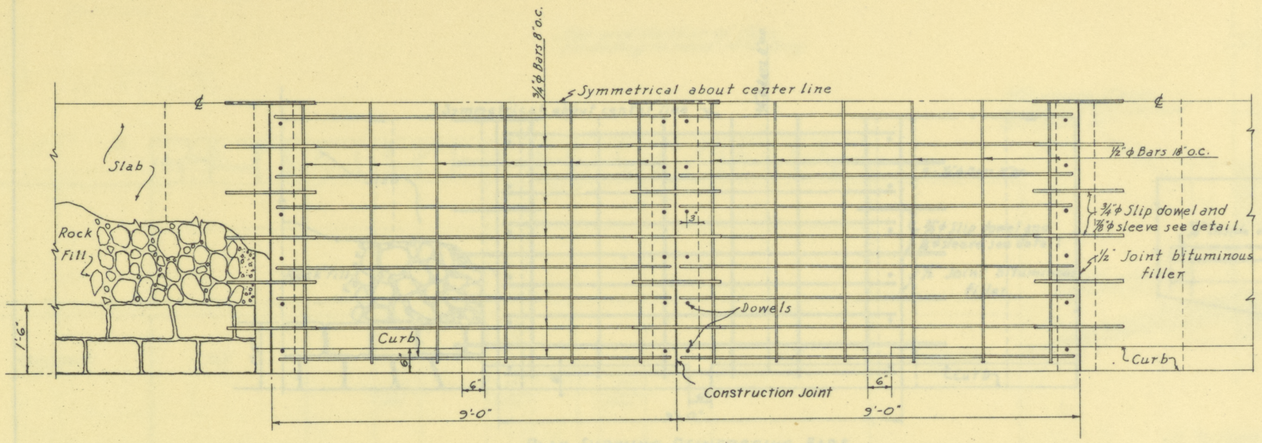


END SECTION

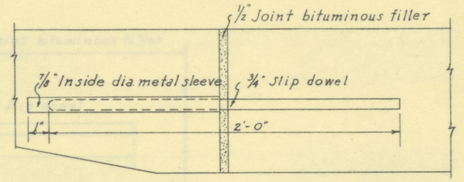
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION N° 7
TYPICAL LAYOUT SLAB TYPE LOW WATER BRIDGE
11-FT. ROADWAY
10-FT TO 25-FT. SPANS

DESIGNED BY:- D.B. & J.D. CHECKED BY:- D.B.
DRAWN BY:- J.D. TRACED BY:- J.D.
SCALE:- NONE DATE:- JUNE 1934
APPROVED _____
REGIONAL ENGINEER

Dwg. No. B-12002



PLAN SHOWING REINFORCING BARS
SCALE ¾" = 1'-0"



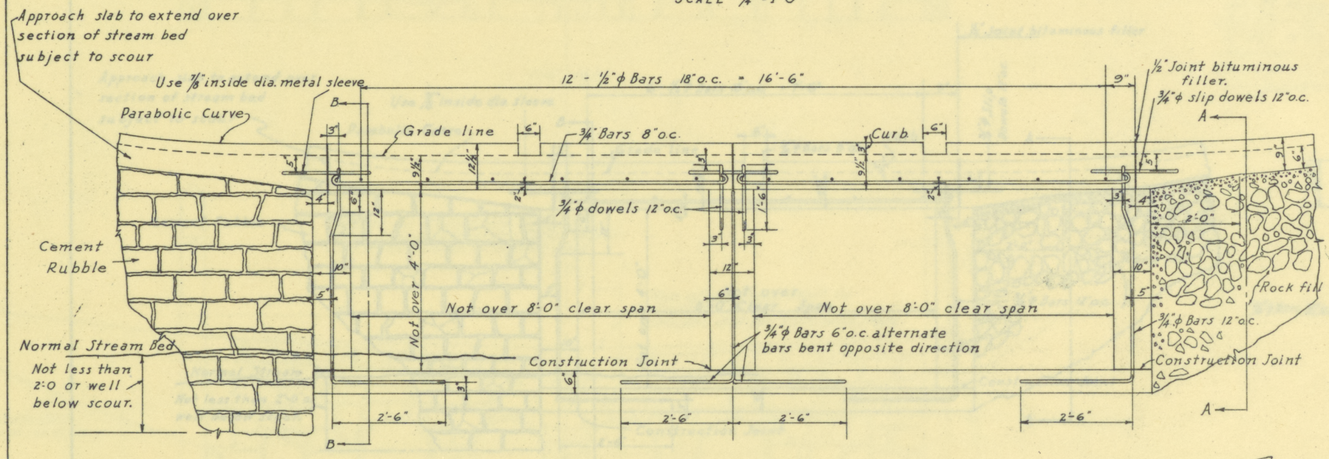
DETAIL OF SLIP DOWEL
SCALE 3" = 1'-0"

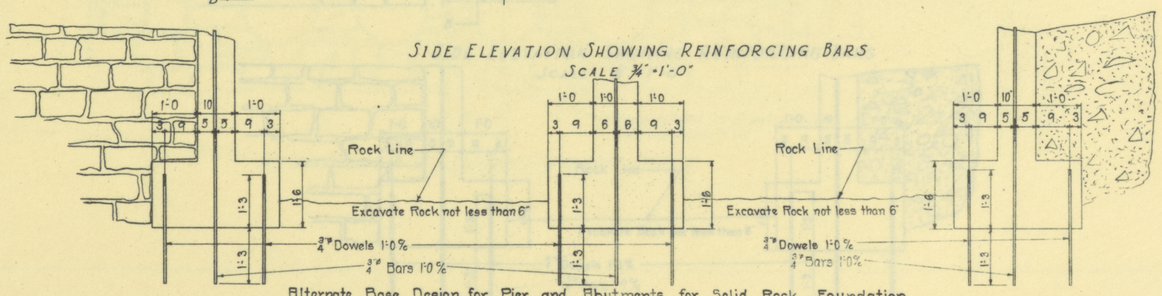
Specifications

1. Reinforcing Bars F.S. QQ-B-71
Type B Grade 1 (Deformed-Structural)
Class A (Open Hearth Steel)
2. Concrete - Class A-1½

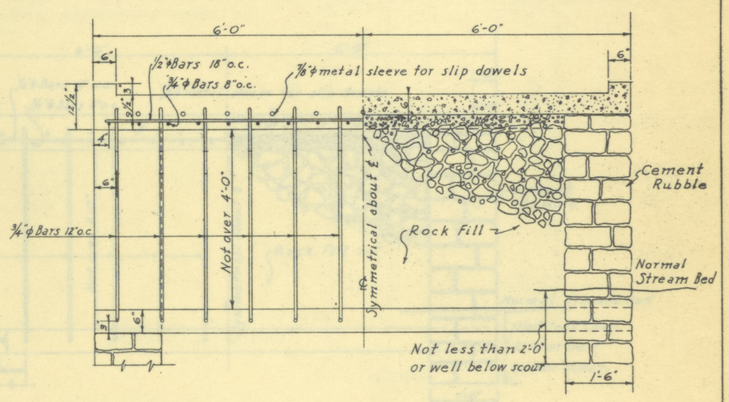
Design Data

H-15 Loading
f_s = 16000 #/in²
f_c = 800 #/in² - n = 10





Alternate Base Design for Pier and Abutments for Solid Rock Foundation



SECTION B-B
SHOWING REINFORCING BARS
SCALE ¾" = 1'-0"

SECTION A-A
SCALE ¾" = 1'-0"

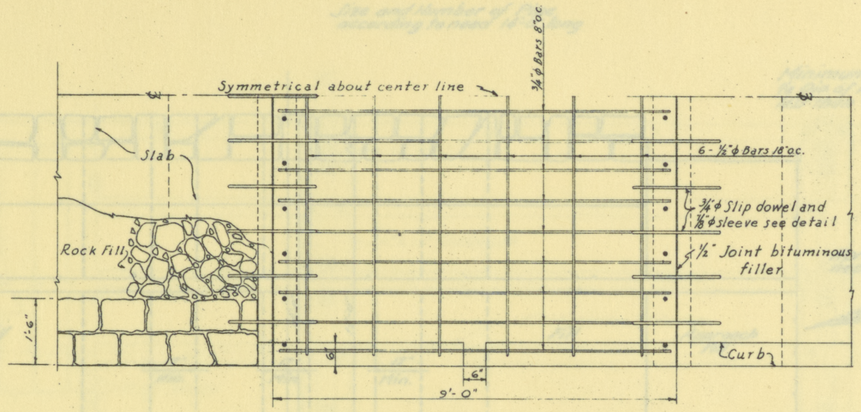
NOTE:-
This design contemplates a rigid structure for six openings or less.
Structures containing more than six openings, shall have specially designed expansion details.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
POUR OVER LOW WATER BRIDGE
(MULTIPLE OPENINGS)

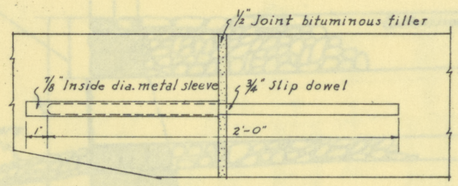
DESIGNED D.B
CHECKED W.C.B
APPROVED _____ Regional Eng.
DRAWN L.T.B.
TRACED L.T.B.
DATE. Octo 35

REVISED OCT. 17-1935
Revised by H.D.J. July 1934

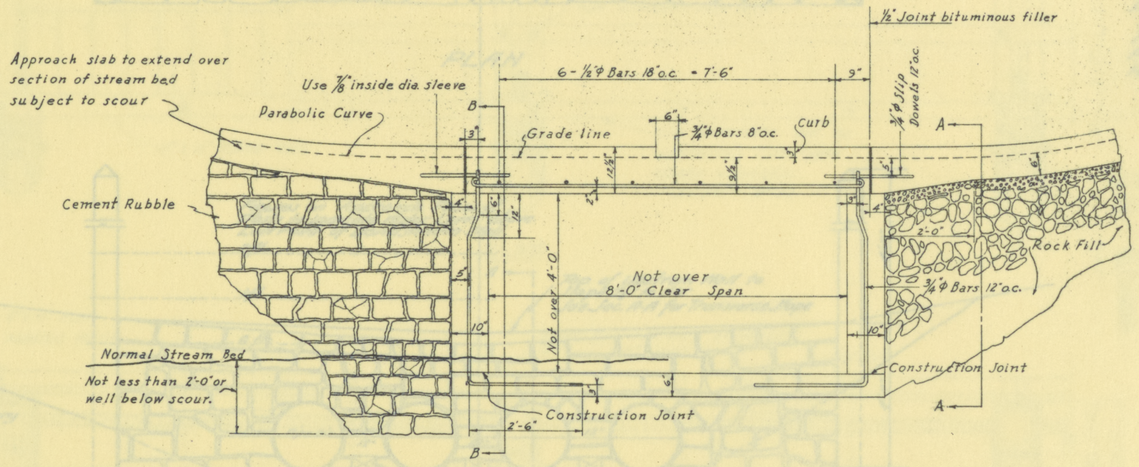
Dwg. No. B-12001



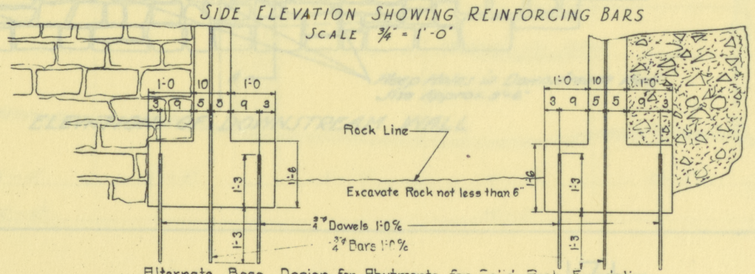
PLAN SHOWING REINFORCING BARS
SCALE 3/4" = 1'-0"



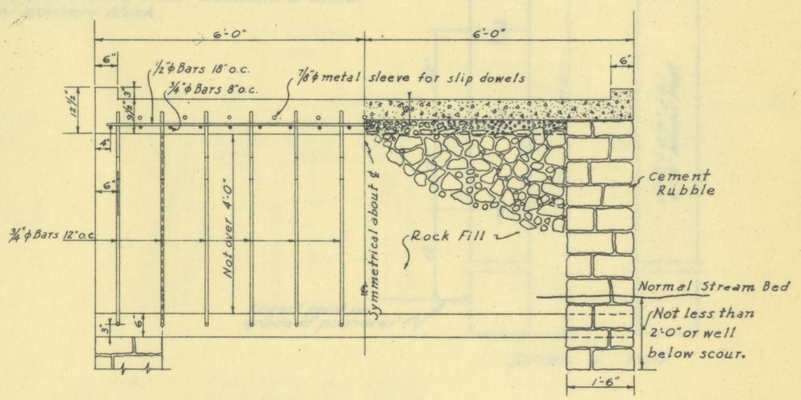
DETAIL OF SLIP DOWEL
SCALE 3" = 1'-0"



SIDE ELEVATION SHOWING REINFORCING BARS
SCALE 3/4" = 1'-0"



Alternate Base Design for Abutments for Solid Rock Foundation



SECTION B-B
SHOWING REINFORCING BARS
SCALE 3/4" = 1'-0"

SECTION A-A
SCALE 3/4" = 1'-0"

Specifications

1. Reinforcing Bars F.S.Q.Q.-B-71
   Type B Grade 1.(Deformed-Structural)
   Class A (Open Hearth Steel)
2. Concrete - Class A-1½

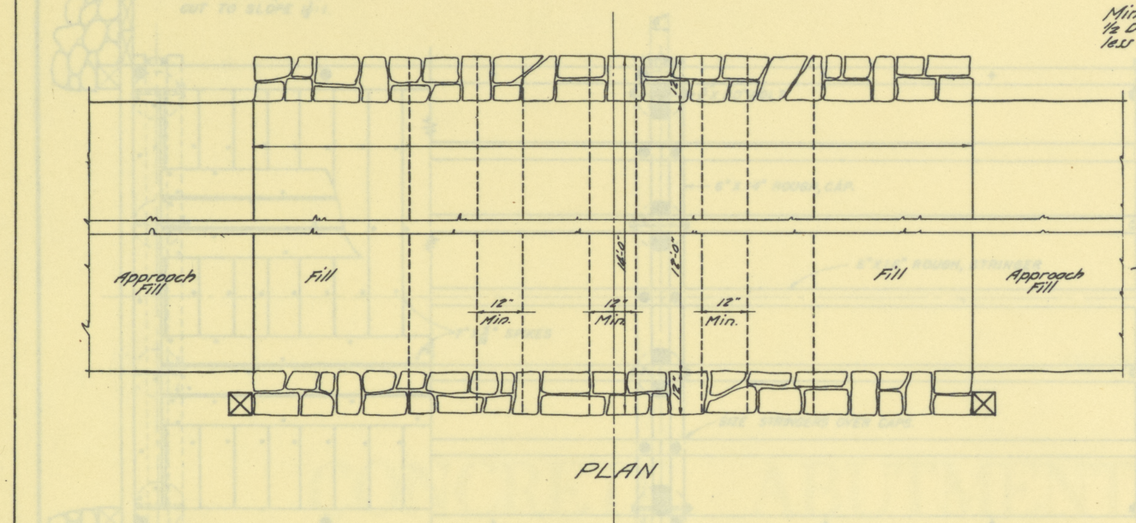
Design Data

H-15 Loading
f_s = 16000 #/in²
f_c = 800 #/in² · n = 10

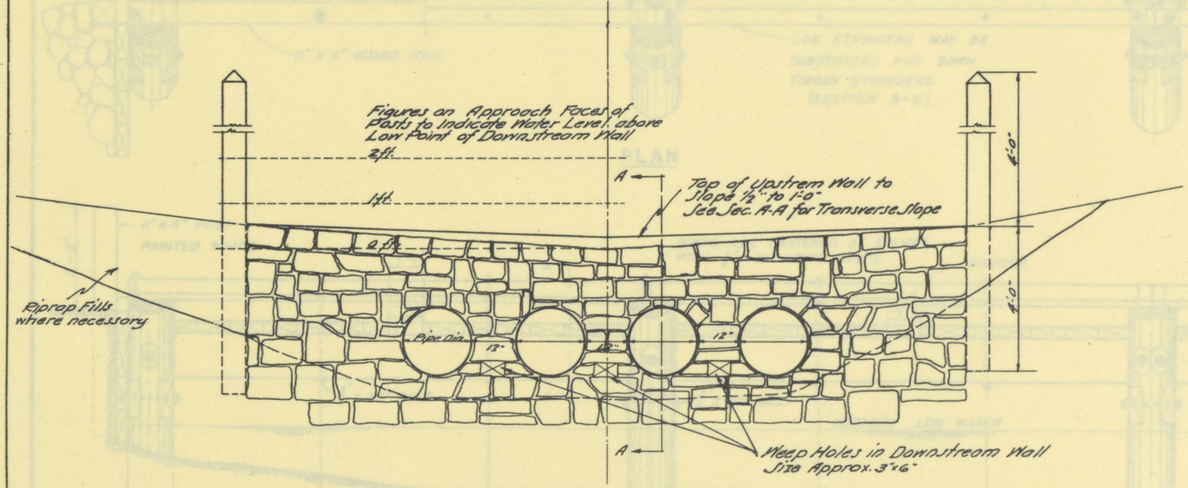
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
POUR OVER LOW WATER BRIDGE
(SINGLE OPENING)

DESIGNED D.B. DRAWN W.I.D.
CHECKED W.I.D. TRACED L.T.B.
APPROVED _____ DATE Oct 1933.
Regional Eng.
Revised by H.D.J. July 1934

Dwg. No. B-12003

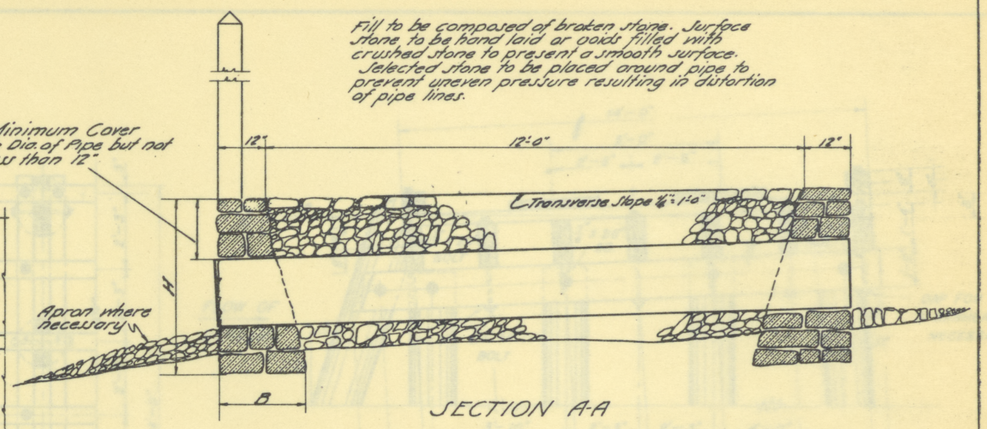


PLAN



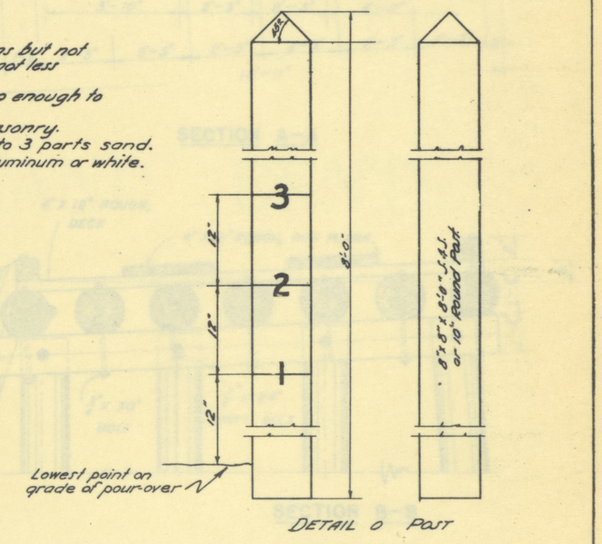
ELEVATION OF DOWNSTREAM WALL

Fill to be composed of broken stone. Surface stone to be hand laid or voids filled with crushed stone to present a smooth surface. Selected stone to be placed around pipe to prevent uneven pressure resulting in distortion of pipe lines.



SECTION A-A

H to depend on Conditions but not less than 30" - B = ½ but not less than 24"
Walls to be carried deep enough to stop flow of water.
Walls to be of Rubble Masonry.
Mortar:-1 part cement to 3 parts sand.
Paint posts with 2 coats aluminum or white.
Paint numbers black.



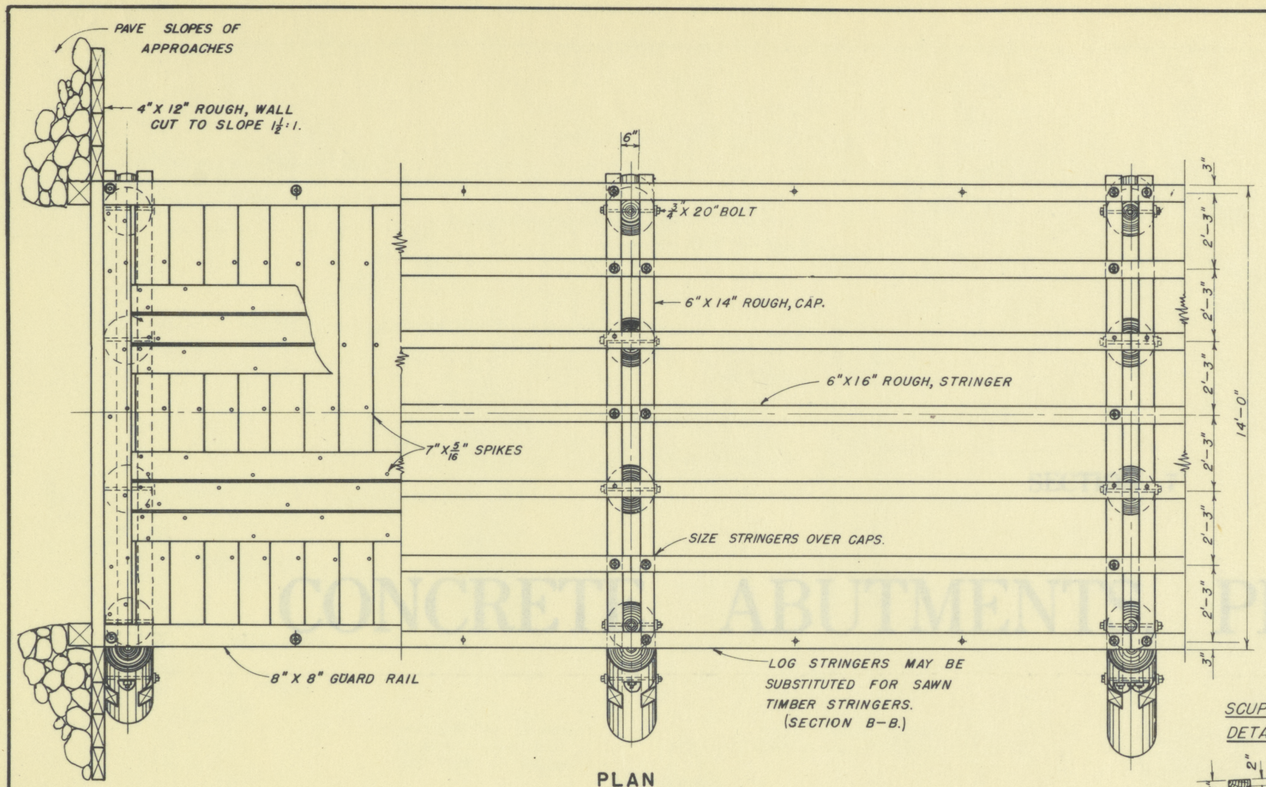
DETAIL O POST

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION No 8
POUR OVER TYPE LOW WATER BRIDGE

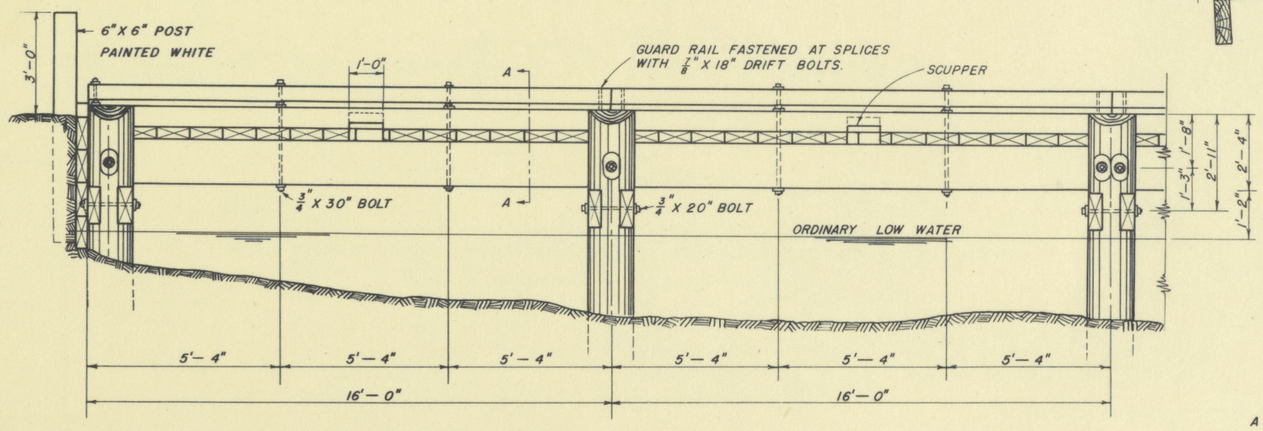
Designed H.M.E.
Drawn K.T.N.
Scale 3/16 & 1½"=1'-0"
Checked B.M.G.
Traced K.T.N.
Feb 1935
Approved
Regional Engineer
Revised Jan. 1936 B.M.G.

B-12003

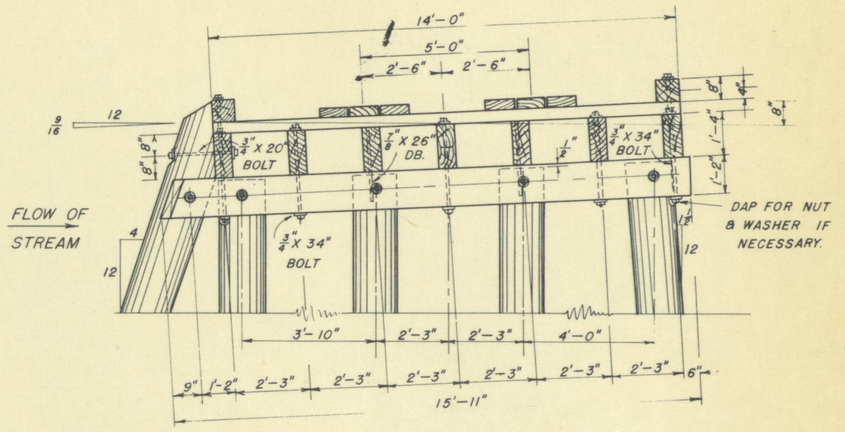
CONCRETE ABUTMENTS, PIERS, AND BENTS



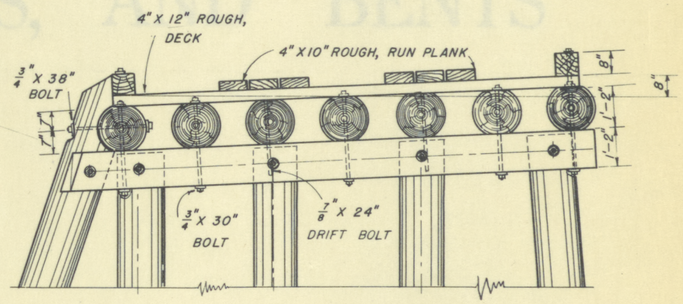
PLAN



UPSTREAM ELEVATION



SECTION A-A



SECTION B-B

SCUPPER DETAIL.

RUN PLANK	4"X10" ROUGH	NO. 1 COMMON
DECK	4"X12" ROUGH	NO. 1 COMMON
GUARD RAIL	8"X 8" ROUGH	NO. 1 COMMON
CAPS	6"X 14" ROUGH	NO. 1 COMMON
STRINGERS (SAWN)	6"X 16" ROUGH	NO. 1 COM. D.F.
STRINGERS (LOG)	14" MIN. DIA.	DOUGLAS FIR
BULKHEAD	4"X 12" ROUGH	NO. 1 COMMON
PILING	16" MIN. BUTTS	

QUANTITIES:—

2,515 F.B.M. SAWN LUMBER PER PANEL.
125 LBS. HARDWARE PER PANEL.

NOTES

DECK TO BE LAID WITH ½" SPACE BETWEEN PLANKS.
CUT ONE SCUPPER IN EACH PANEL.
DAP ALL PILING TO RECEIVE CAPS LEAVING A MINIMUM CORE OF 6".
ALL HOLES BORED 13/16"
10'-0" MINIMUM PENETRATION OF ALL PILING.
PILING TO BE EITHER DOUGLAS FIR OR CEDAR.

H-15 LOADING

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 6

STANDARD
LOW WATER BRIDGE
PILE SUBSTRUCTURE

DEC. 19, 1935 — SCALE ½"=1'-0"

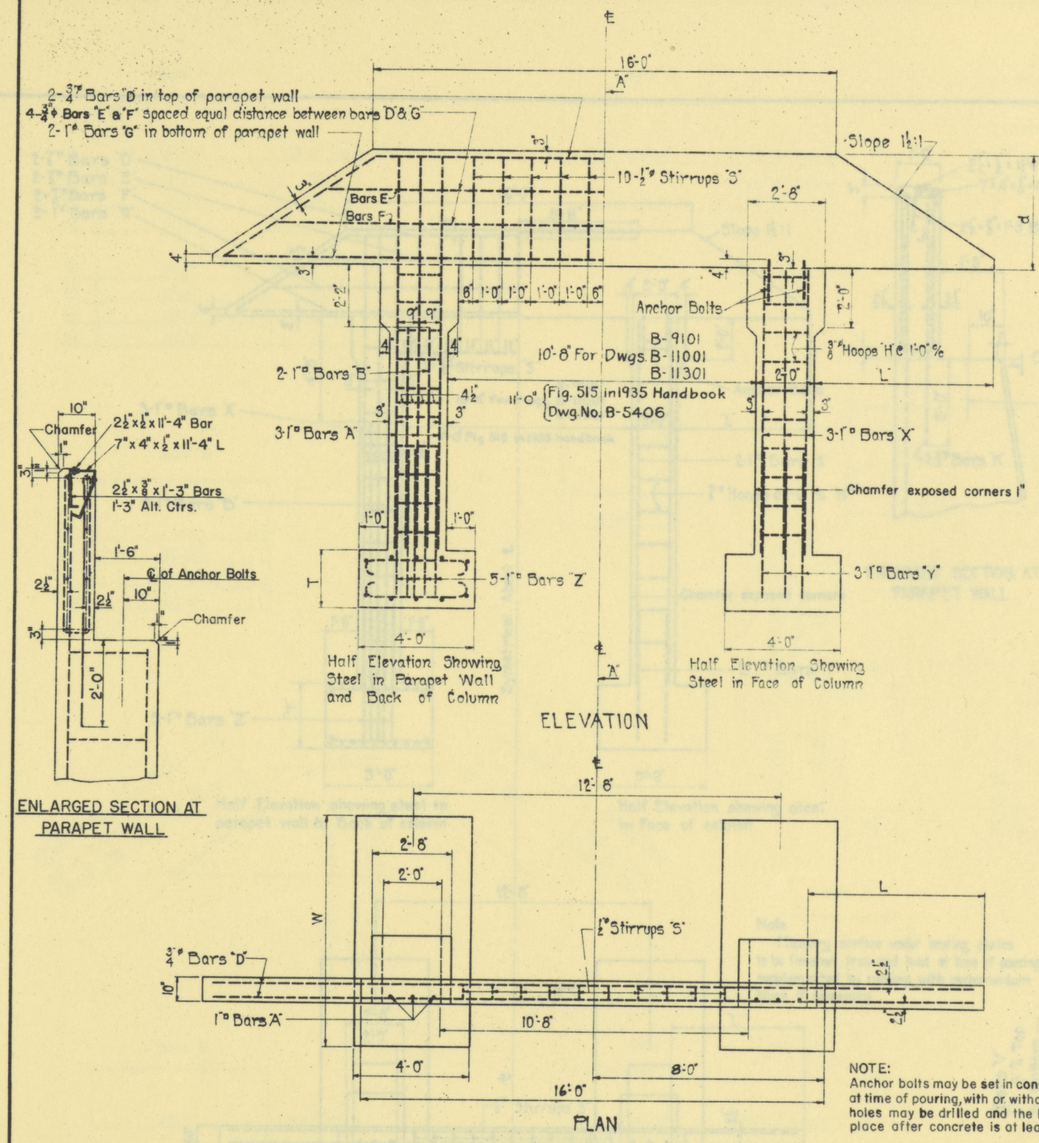
DESIGNED BY R.W.L.	APPROVED
DRAWN BY R.W.S.	
TRACED BY R.W.S.	REGIONAL ENGINEER
CHECKED BY	

2-P-3

SECTION 7

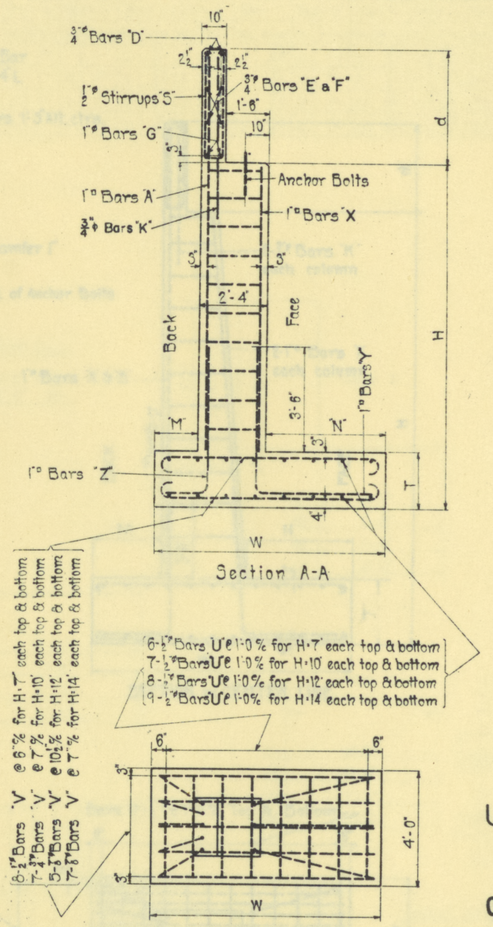
CONCRETE ABUTMENTS, PIERS, AND BENTS

R-7-DRAWING No. B-1201



NOTE:
Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

For bending diagram see Dwg. B-1203



Note:
Masonry surfaces under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.

Rev. Specifications. Feb. 3-1936. A.N.B.
Rev. 10-2-35
Rev. 9-23-35
Rev. 8-16-35

Span	Dwg Nº	Loading	d	L
70'-0	B11001	H-10	3'-4⅛	5'-2
80'-0	B11301	H-10	4'-0	5'-2
93'-4	B-9101	H-10	4'-0	5'-2

Use Dwg-B1202 for all spans for Heights of Abutments greater than 14'-0

Height	Base Dimensions			
	Length	Toe	Heel	Thickness
H	W	N	M	T
7	6'-0	2'-8	1'-0	2'-0
10	7'-0	3'-2	1'-6	2'-0
12	8'-0	4'-2	1'-6	2'-6
14	9'-0	4'-8	2'-0	2'-6

Height	Cu. yds.			Bags of Cement
	Concrete	Stone	Sand	
7	7.9	6	4	53
10	9.3	8	5	62
12	11.6	10.0	6	78
14	13.3	11.0	7	89

Design Data

1. Horizontal Surcharge 300# per sq. ft.
   fs = 16000#/sq.in.
   fc = 650#/sq.in. n = 15
2. This abutment is suitable for foundation of well compacted clay or gravel
3. Chamfer all exposed corners 1"

Specifications

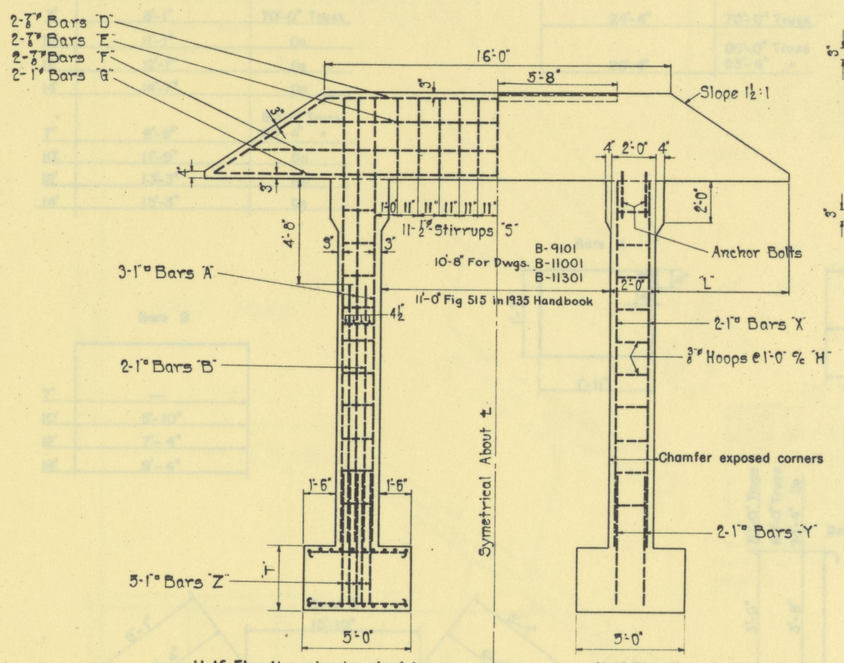
1. Reinforcing Bars: F.S. 00-B-71
   Bars: Type B Grade 1
   Deformed: Structural
   Class A (Open Hearth Steel)
2. Concrete: Class A 1½

U S DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION Nº 7
OPEN ABUTMENTS FOR TRUSS BRIDGES
11'-0" ROADWAY H10-LOADING
DRAWINGS B-9101, B-11001 & B-11301
HEIGHT 7' to 14'

DESIGNED:- N.W.W.
DRAWN :- H.D.J.
APPROVED _____ Regional Engineer
CHECKED:- H.D.J.
TRACED :- H.D.J.
DATE:- 10-19-1934

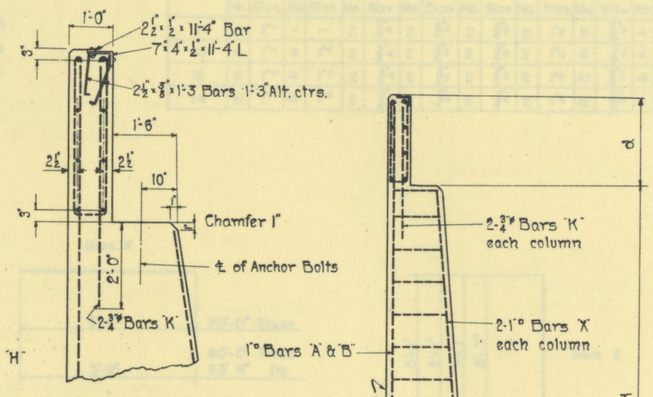
MODIFICATION OF DRAWING Nº B2601

R-7-DWG.NO. B-1202

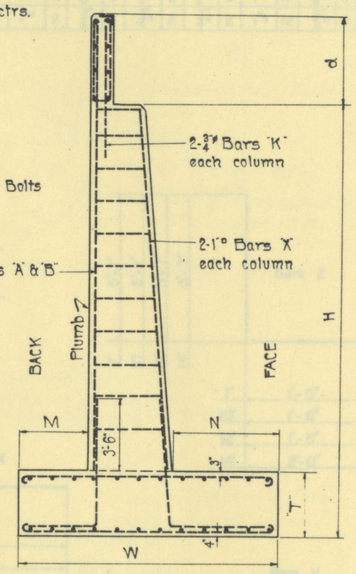


Half Elevation showing steel in parapet wall & Back of column

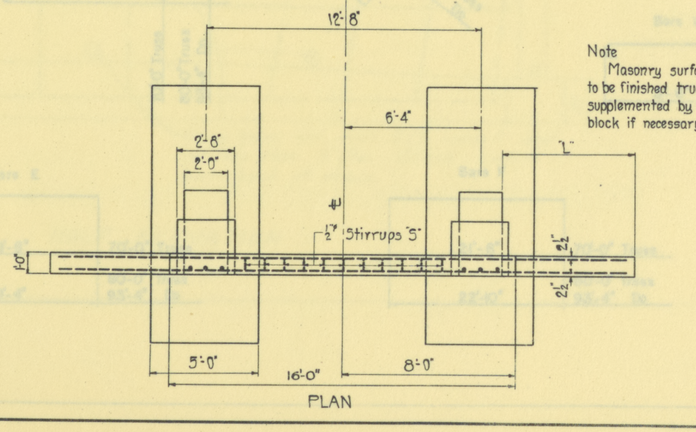
Half Elevation showing steel in Face of column



ENLARGED SECTION AT PARAPET WALL

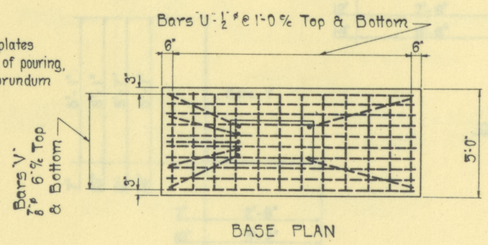


SECTION on CENTER LINE



PLAN

Note
Masonry surface under bearing plates to be finished true and level at time of pouring, supplemented by rubbing with carborundum block if necessary



BASE PLAN

NOTE. Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

H	Cubic Yards			Nº Bags Cement
	Concrete	Sand	Stone	
16	20.3	10	16	135
18	22.5	11	18	150
20	24.8	12	20	165

DESIGN DATA

1- Horizontal surcharge - 300#/sq. ft.
fs = 16000#/sq.in
fc = 650#/sq.in n = 15
2- This Abutment suitable for foundation of well compacted clay or gravel
3. Chamfer all exposed corners 1"

Length c/c of Bearings	Plan Nº	d	L
70'-0	B-11001	3'-4½"	5'-2
80'-0	B-11301	4'-0	6'-2
93'-4	B-9101	4'-0	6'-2

Use Dwg Nº B-1201 for height of 14'-0 or less

HEIGHT	Base Dimensions			
	Length	Toe	Heel	Thickness
H	W	N	M	T
16	10'-0	3'-11	2'-6	3'-0
18	11'-0	4'-3	3'-0	3'-0
20	12'-0	4'-10	3'-3	3'-0

SPECIFICATIONS

1- Reinforcing Bars: F.S. 99-B-71
Bars- Type B, Grade 1-
(Deformed- Structural)
(Class-A) (Open Hearth Steel)
2- Concrete: Class A-1½

For Bending Diagram See Drg. No. B-1204

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
OPEN ABUTMENT
TRUSS BRIDGES, 11-FT. ROADWAY
DWGS. - B-9101, B-11001, B-11301
HEIGHT 16 FT. TO 20 FT.

DESIGNED:- O.K.W.W.
DRAWN:- A.C.F.
APPROVED: Regional Engineer
CHECKED:- H.D.J.
TRACED:- H.D.J. N.W.W.
DATE:- Oct. 15, 1934
Modification of Dwg. 2602

Rev. 2-3-1936. A.H.B.
Rev. 10-2-1935
Rev. 7-19-35 To Show Chamfer and Anchor Bolt note.

Bars A

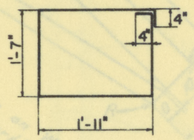
7'	8'-1"	70'-0" Truss
10'	11'-1"	Do
12'	12'-7"	Do
14'	14'-7"	Do
7'	8'-9"	80'-0 Truss 93'-4" "
10'	11'-9"	Do
12'	13'-3"	Do
14'	15'-3"	Do

Bars G

24'-4"	70'-0" Truss
26'-4"	80'-0" Truss 93'-4" "

Height	Bars Required																													
	Bars A		Bars B		Bars D		Bars E		Bars F		Bars G		Bars H		Bars K		Bars S		Bars U		Bars V		Bars X		Bars Y		Bars Z		Weight
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Lbs.
7	6	1"□	–	–	2	3/4"ϕ	2	3/4"ϕ	2	3/4"ϕ	2	1"ϕ	5	3/8"ϕ	4	3/4"ϕ	10	1/2"ϕ	24	1/2"ϕ	32	1/2"ϕ	6	1"□	6	1"□	10	1"□	1350
10	6	1"□	4	1"□	2	3/4"ϕ	2	3/4"ϕ	2	3/4"ϕ	2	1"ϕ	8	3/8"ϕ	4	3/4"ϕ	10	1/2"ϕ	28	1/2"ϕ	28	3/4"ϕ	6	1"□	6	1"□	10	1"□	1800
12	6	1"□	4	1"□	2	3/4"ϕ	2	3/4"ϕ	2	3/4"ϕ	2	1"ϕ	10	3/8"ϕ	4	3/4"ϕ	10	1/2"ϕ	32	1/2"ϕ	20	7/8"ϕ	6	1"□	6	1"□	10	1"□	2000
14	6	1"□	4	1"□	2	3/4"ϕ	2	3/4"ϕ	2	3/4"ϕ	2	1"ϕ	12	3/8"ϕ	4	3/4"ϕ	10	1/2"ϕ	36	1/2"ϕ	28	7/8"ϕ	6	1"□	6	1"□	10	1"□	2350

Bars H



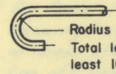
Bars K

5'-1"	70'-0" Truss
5'-9"	80'-0" Truss 93' 4" Do

Bars Z

7'	5'-1"	5'-1"	5'-7"	5'-7"
10'				
12'				
14'				

7'	1'-0"
10'	1'-6"
12'	1'-6"
14'	2'-0"



Radius = 3 diam. of bar.
Total length of hook at least 16 bar diameters.

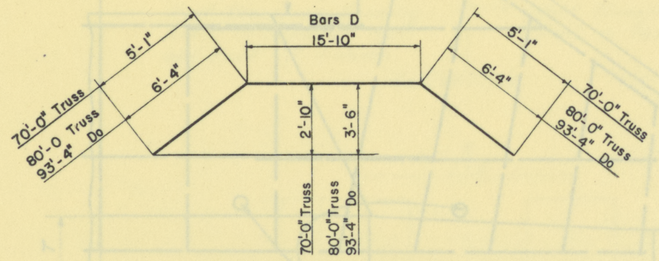
TYPICAL HOOK

Note: Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

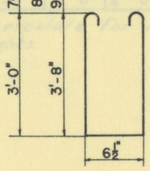
Bars B

7'	—
10'	5'-10"
12'	7'-4"
14'	9'-4"

Bars D



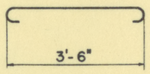
Bars S



Bars X

7'	4'-9"
10'	7'-9"
12'	9'-3"
14'	11'-3"

Bars U



Bars V

7'	5'-6"
10'	6'-6"
12'	7'-6"
14'	8'-6"

Bars E

18'-8"	70'-0" Truss
19'-4"	80'-0" Truss 93'-4" Do

Bars F

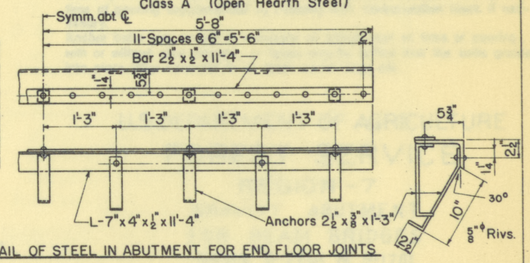
21'-6"	70'-0" Truss
22'-10"	80'-0" Truss 93'-4" Do

Bars Y

7'	5'-1"	5'-1"	5'-7"	5'-7"
10'				
12'				
14'				

7'	2'-8"
10'	3'-2"
12'	4'-2"
14'	4'-8"

Specifications
Reinforcing bars — F.S.Q.Q. – B-71
Type B - Grade - 1 (Deformed Structural)
Class A (Open Hearth Steel)

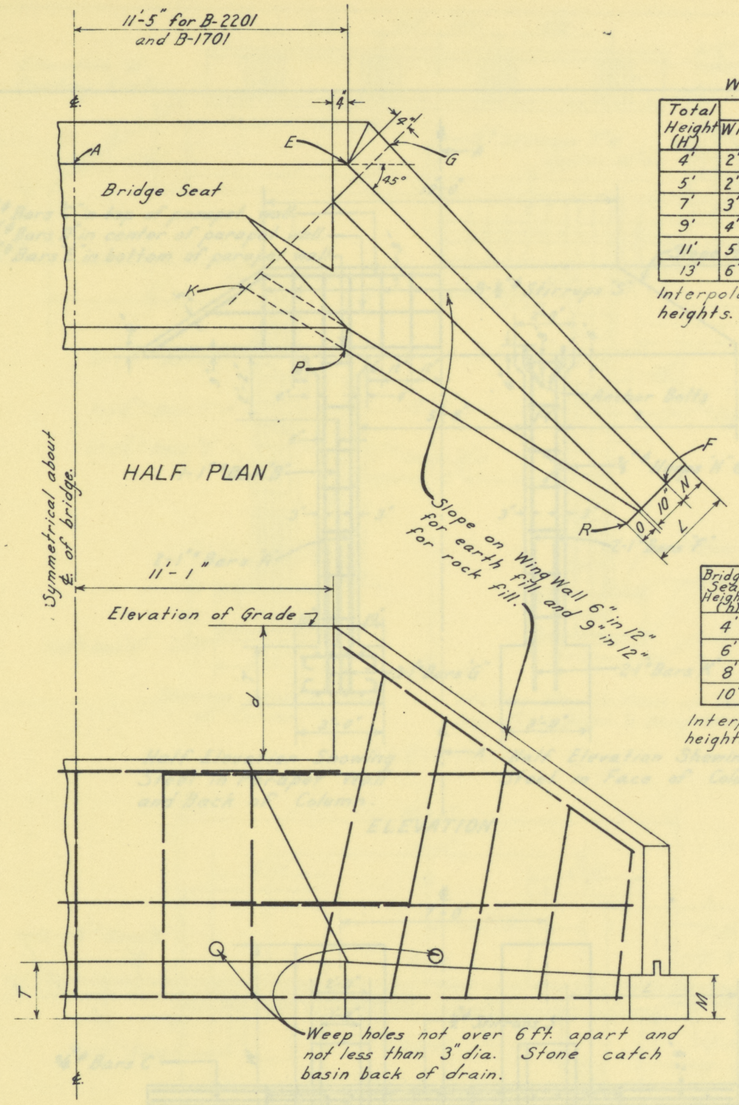


DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINTS

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
REINFORCED CONCRETE ABUTMENT DWG. B-1201
FOR USE WITH
DWGS B-11001, B-11301, B-9101

DESIGNED M.W.W. DRAWN M.W.W.
CHECKED A.M. TRACED A.M. M.W.W.
RECOMMENDED FOR APPROVAL DATE Sept. 1935
E.E.M. APPROVED
REGIONAL ENGINEER

DWG. NO. B-2401



WING WALL

Total Height (H)	Base Width L	Thickness M	Toe N	Heel O
4'	2'-0"	1'-0"	6"	6"
5'	2'-6"	1'-0"	6"	6"
7'	3'-6"	1'-0"	9"	6"
9'	4'-8"	1'-4"	1'-0"	6"
11'	5'-9"	1'-8"	1'-3"	8"
13'	6'-10"	2'-0"	1'-6"	10"

Interpolate for intermediate heights.

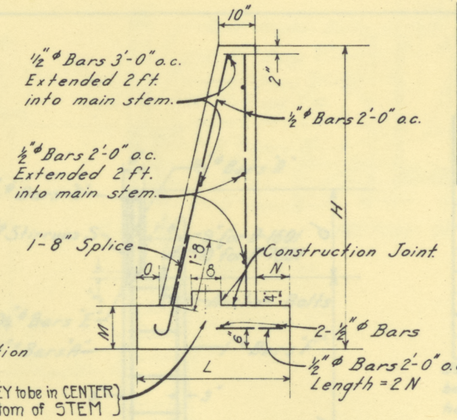
Note:—
Use wing wall section for retaining walls.

ABUTMENT

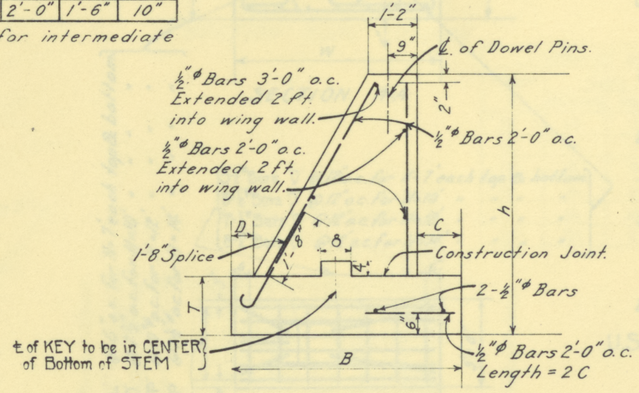
Bridge Seat Height (h)	Base Width B	Thickness T	Toe C	Heel D
4'	4'-3"	1'-0"	9"	6"
6'	5'-3"	1'-4"	1'-0"	6"
8'	6'-2"	1'-8"	1'-3"	8"
10'	7'-0"	2'-0"	1'-6"	10"

Interpolate for intermediate heights.

Note:—
Use timber Bulkhead when using temporary timber decking (Dwg. B-1701)



SECTION THRU WING WALL



SECTION THRU ABUTMENT

Span	B-2201 d
25	2'-5¾"
33	2'-11⅝"
41	3'-2⅝"
49	3'-6"
57	3'-8⅝"
65	3'-9⅛"

Specifications

1-Reinforcing Bars F.S.QQ-B-71 Bars - Type B Grade 1 (Deformed Structural) Class (a) (Open Hearth Steel)
2-Concrete - Class C
3-Chamfer all exposed corners 1"

Design Data

1-Abutment - Horizontal surcharge of 300# per square foot.
2-Wing Wall - Sloping surcharge 1½:1.
3-This abutment is suitable for foundation of well compacted clay or gravel if below point subject to scouring.

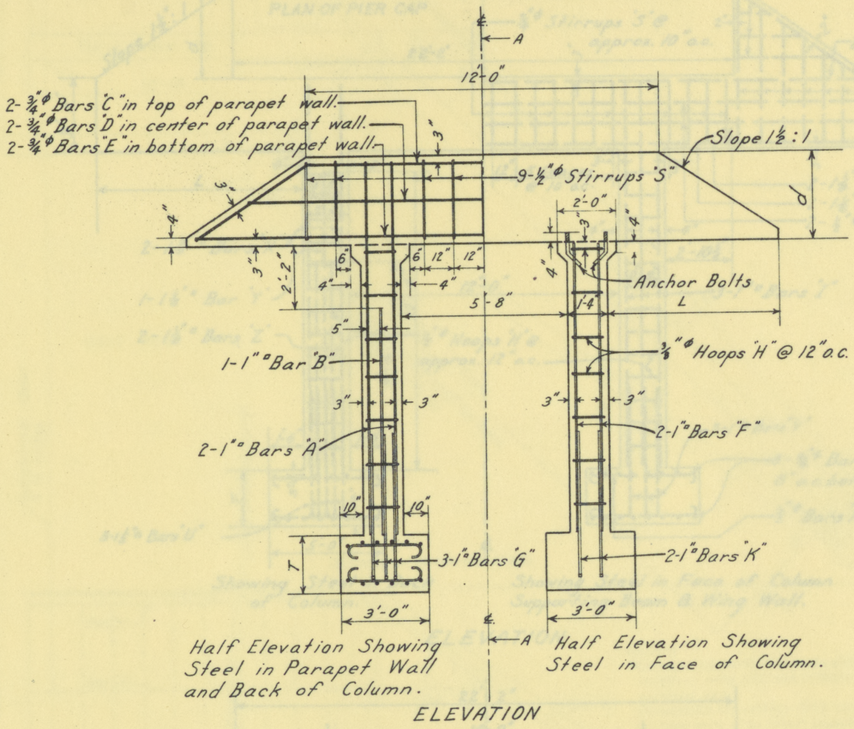
Notes:—
1. On center line of bridge establish point for face of bridge seat "A"
2. Knowing height of bridge seat (h), layout base of main stem and locate point "E"
3. Lay off line "EF" at angle of 45° and "GK" at right angles to "EF"
4. Measure "GK" equal to the base width "L" for wing wall of height "H=h+d"
5. Determine length of wing wall from desired end height and slope of top of wall and establish point "F."
6. Lay off base of end wall according to table of dimensions given for wing walls.
7. Extend "RK" to "P" at intersection with base of main stem.

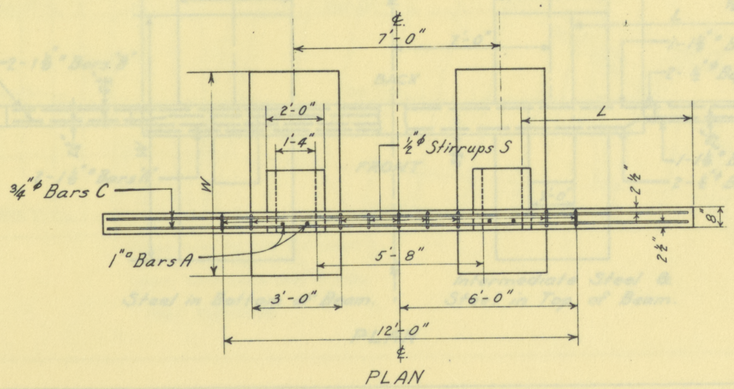
Masonry surface under bedring plates to be finished true and and level at time of pouring supplemented by rubbing with carborundum block if necessary.
Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

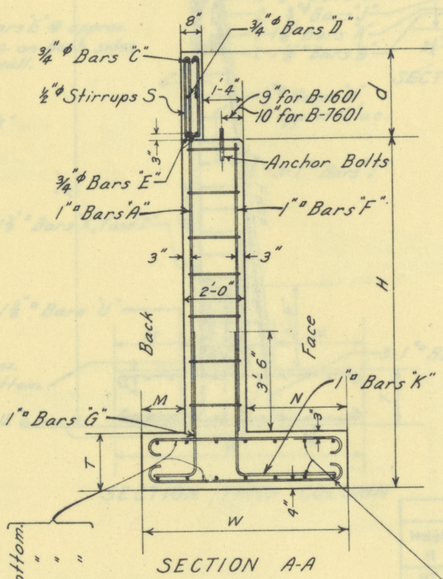
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
GRAVITY ABUTMENT
FOR BEAM BRIDGES
DWGS. B-2201 & B-1701
DESIGNED & CHECKED REP & D.B.
DRAWN DR & M.E.G. TRACED M.E.G.
APPROVED [signature] DATE Feb 1932
Regional Eng. Revised June 1934 L.T.S.
Rev. for Construction Keys 12-14-34 H.D.J.

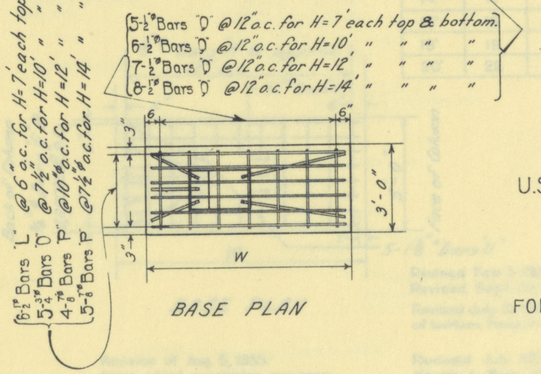
Revised 2-3-1936-Notes added, Specifications revised. C.C.J.

DWG. NO. B-2601









SPAN	H-10, B-7601	B-7601	H-15, B-1601	B-1601
	d	L	d	L
17	2'-2 5/8"	4'-8"	——	——
21	2'-4½"	4'-11"	——	——
25	2'-6 3/8"	5'-2"	3'-0½"	5'-11"
28	2'-6 3/8"	5'-2"		
33	2'-9 3/8"	5'-6"		
41	3'-0 3/8"	5'-11"		
49	3'-0 3/8"	5'-11"		
57				
65				

Use Dwg. B-2602 for any height for spans below heavy line and for all spans for heights greater than 14-feet.

Height	Base Dimensions			
	Length	Toe	Heel	Thickness
H	W	N	M	T
7	5'-0"	2'-0"	1'-0"	1'-6"
10	6'-0"	2'-6"	1'-6"	1'-6"
12	7'-0"	3'-6"	1'-6"	2'-0"
14	8'-0"	4'-0"	2'-0"	2'-0"

Design Data

1- Horizontal Surcharge 300# per sq. ft.
f_s = 16,000#/□" Net Area.
f_c = 650#/□" - n= 15
2- This abutment is suitable for foundation of well compacted clay or gravel.
3- Champfer all exposed corners ¾"

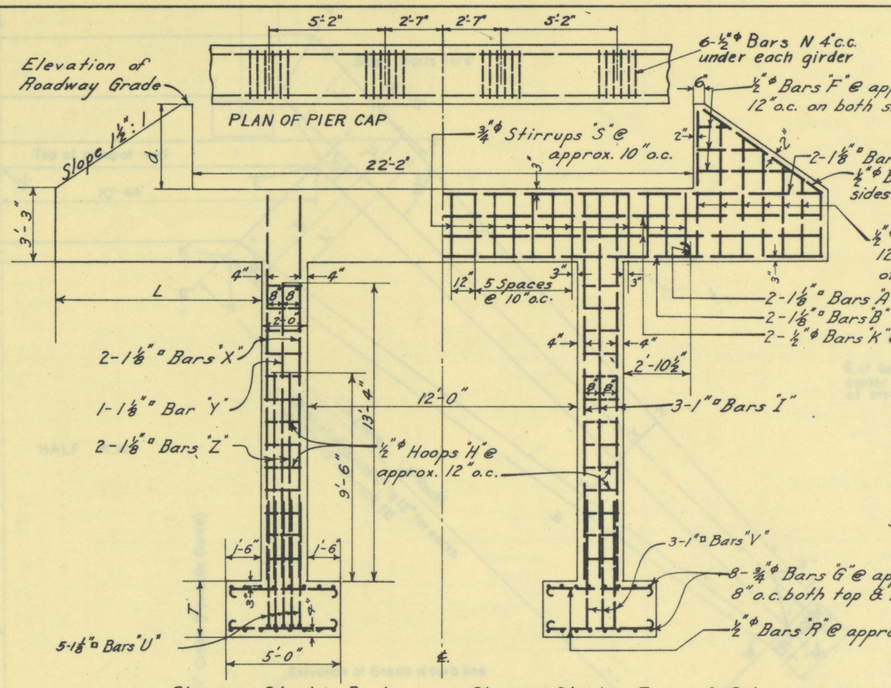
Specifications

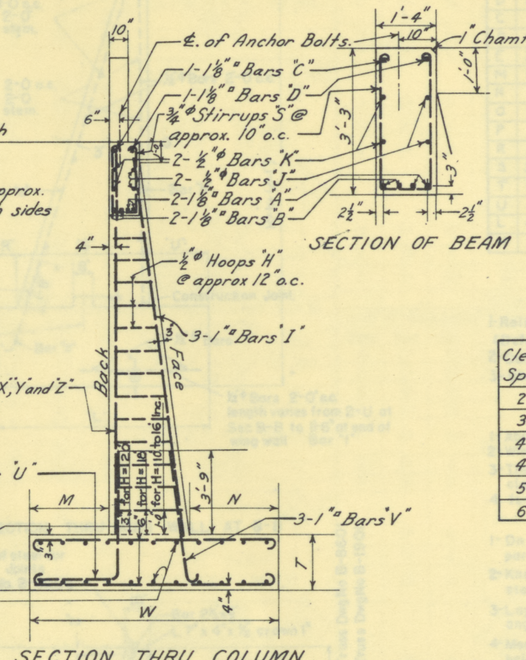
1- Reinforcing Bars F.S.Q.Q.-B-71
Bars - Type B Grade 1
Deformed - Structural grade
Class (a) or (b) (Open Hearth Steel)
2- Concrete - Class A 1½

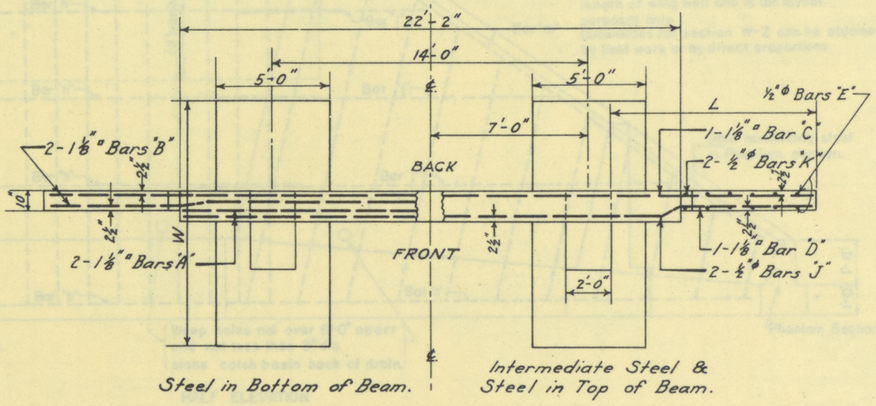
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
OPEN ABUTMENT
FOR BEAM BRIDGES - 11-FT. ROADWAY
DWGS. B-7601 & B-1601
MAXIMUM HEIGHT 14-FEET

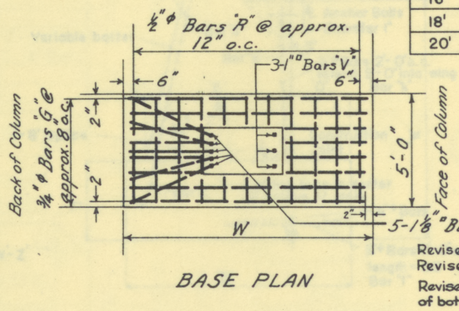
DESIGNED & CHECKED R.E.P. & O.B.
DRAWN O.B. & M.E.G. TRACED M.E.G.
APPROVED _____ Regional Eng. DATE March 1933.
Revised June 1934. L.T.S.
Revised July 1934 H.D.J.

DWG. NO. B-2701









Specifications

1- Reinforcing Bars F.S.00-B-71 Bars-Type B-Grade 1 [Deformed Structural] Class (a) (Open Hearth Steel.)
2- Concrete-Class A-1½

Design Data

1- Horizontal Surcharge 300# per sq. ft.
f_s = 16000 #/□"
f_c = 650 #/□" - N = 15
2- This abutment is suitable for foundation of well compacted clay or gravel.

Clear Span	B-2201 d	B-2201 L
25'	2'-5¾"	7'-1"
33'	2'-11⅝"	7'-11"
41'	3'-2⅝"	8'-4"
49'	3'-6"	8'-8"
57'	3'-8⅞"	9'-1"
65'	3'-9⅛"	9'-1"

Note: Masonary surfaces under bearing plates to be finished true & level at time of pouring supplemented by rubbing with carborundum block if necessary.
Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

Chamfer all exposed edges 1".

For bending diagram see Dwg. 2703

TABLE OF QUANTITIES (APPROX.)

Height H	Cubic Yards Concrete	Sand	Stone	Bags of Cement	Reinfg Stl. Pounds
10'	13	7	10	85	2850
12'	14	7	11	92	3050
14'	15	8	12	99	3200
16'	16	8	13	105	3400
18'	19	10	16	125	3500
20'	22	11	18	145	3700

Base Dimensions Height H	Width W	Thickness T	Toe N	Heel M
10'	7-6	2-0	3-0	2-3
12'	8-6	2-0	3-6	2-6
14'	9-0	2-0	3-6	2-9
16'	9-6	2-0	3-6	3-0
18'	10-0	2-6	3-9	3-0
20'	11-0	2-9	4-0	3-6

Revision of Aug. 5, 1935.
Notes added concerning masonary under bearing plates, anchor bolts and bending diagram.

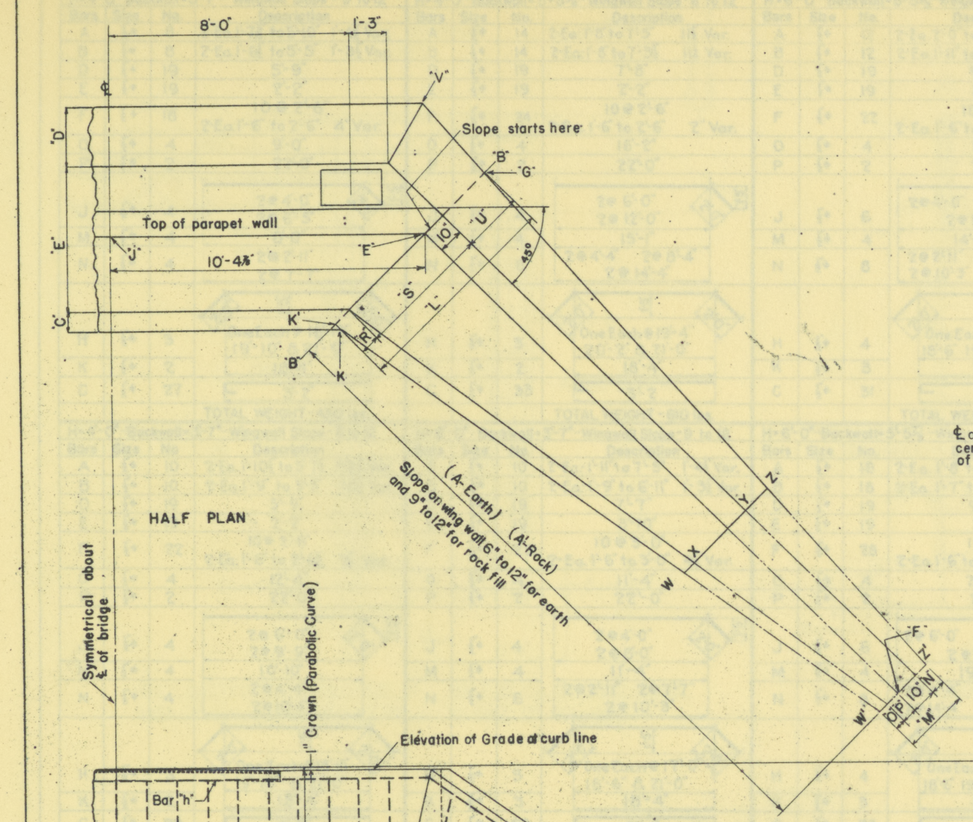
Revised Feb. 3-1936. A.H.B
Revised Sept 30, 1935
Revised July 31, 1935 as to position of bottom hoop in columns

Revised July 29, 1935 as to FRONT & BACK shown on Plan

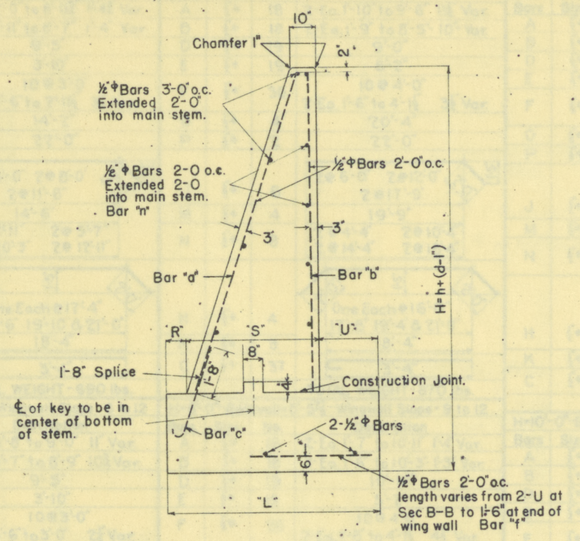
Revised as to d dimensions

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-7
OPEN ABUTMENT FOR BEAM BRIDGE WITH CONCRETE DECK
19FT. ROADWAY—MAXIMUM SPAN 65'-0"
MAXIMUM HEIGHT 20-FEET
(DWG. NO. B-2201 & B-1701

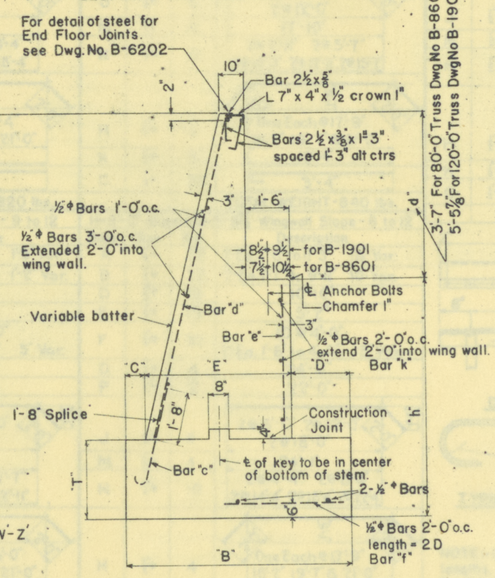
DESIGNED & CHECKED O.B. & R.E.P.
DRAWN M.E.G. TRACED M.E.G.
APPROVED [signature] DATE April 1933.
Regional Eng.



Note A
Phantom section W'-Z' is beyond the usual length of wing wall and is for layout purposes only.
Dimensions for section W-Z can be obtained by field work or by direct proportions



SECTION THRU WING WALL AT B-B



SECTION THRU ABUTMENT ON ℄

TABLE OF DIMENSIONS FOR BRIDGES WITH CONCRETE DECK

h	4'-0"		6'-0"		8'-0"		10'-0"	
d	3'-7"	5'-5⅞"	3'-7"	5'-5⅞"	3'-7"	5'-5⅞"	3'-7"	5'-5⅞"
A'	6'-8"	9'-2½"	9'-4"	11'-10½"	12'-0"	14'-6½"	14'-8"	17'-2½"
A	10'-0"	13'-9¾"	14'-0"	17'-9¾"	18'-0"	21'-9¾"	22'-0"	25'-9¾"
B	5'-0"	5'-0"	6'-3"	6'-3"	7'-6"	7'-6"	8'-6"	8'-6"
C	4"	4"	6"	6"	8"	8"	10"	10"
D	1'-3"	1'-3"	1'-6"	1'-6"	2'-0"	2'-0"	2'-6"	2'-6"
E	3'-5"	3'-5"	4'-3"	4'-3"	4'-10"	4'-10"	5'-2"	5'-2"
M	2'-3"	2'-2"	2'-3"	2'-2"	2'-3"	2'-2"	2'-3"	2'-2"
N	6"	6"	6"	6"	6"	6"	6"	6"
O	4"	4"	4"	4"	4"	4"	4"	4"
P	7"	6"	7"	6"	7"	6"	7"	6"
R	4"	4"	6"	6"	8"	8"	10"	10"
S	3'-2"	3'-2"	3'-10"	3'-10"	4'-4"	4'-4"	4'-11"	4'-11"
T	1'-8"	1'-8"	2'-0"	2'-0"	2'-8"	2'-8"	3'-4"	3'-4"
U	1'-3"	1'-3"	1'-6"	1'-6"	2'-0"	2'-0"	2'-6"	2'-6"
L	4'-9"	4'-9"	5'-10"	5'-10"	7'-0"	7'-0"	8'-3"	8'-3"
H	7'-6"	9'-4⅞"	9'-6"	11'-4⅞"	11'-6"	13'-4⅞"	13'-6"	15'-4⅞"

Specifications
1-Reinforcing Bars F.S.Q.Q.- B 71 Bars Type-B-Grade-1 (Deformed Structural) Class A — (Open-hearth Steel)
2-Concrete Class C
3-Chamfer all exposed edges 1"

Design Data
1-Abutment- Horizontal Surcharge of 300 lbs. per sq.ft.
2-Wing-wall Sloping Surcharge 1½:1
3-This Abutment is suitable for foundation of well compacted clay or gravel if below point subject to scouring.
4- fs=16000#/sq.in. fc=650#/sq.in. n=15

Layout Procedure
1-On center line of bridge establish point for back of parapet wall "J".
2-Knowing height of bridge seat "h" layout base of main stem and locate point "E".
3-Lay off line "EF" at angle of 45° and GK' at right angles to "EF".
4-Measure GK' equal to base width "L" for wing wall of height H = h+(d-1')
5-Establish Point "F" from dimensions A or A'.
6-Lay off base of Section W'-Z' according to table of dimensions given for wing walls.
7-Intersect W'K' with base of main stem to establish K.
8-Extend ZG to intersect base of main stem at "V".
9 Determine length of wing wall from topography of site and locate points W, X, Y and Z.

Notes:- Masonry Surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.
Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.
For Reinforcing Steel see Dwg. B-6202.

REVISED-FEB. 3-1936 C.C.J.
REVISED-NOV. 8-1935
REVISED-OCT. 21-1935

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

GRAVITY ABUTMENT
WITH PARAPET WALL
FOR DWGS. B-1901 And B-8601, CONCRETE DECK

DESIGNED H.D.J. DRAWN AHB
CHECKED [illegible] TRACED F.L.B. 11-10-35
RECOMMENDED FOR APPROVAL [illegible] DATE APRIL 1934
APPROVED [illegible] REGIONAL ENGINEER

H=4'-0" Backwall=3'-7" Wingwall Slope - 9 to 12

Bars	Size	No.	Description
A	½	8	2-Ea.1'-7½" to 5'-10" 1'-4½" Var.
B	½	8	2-Ea.1'-6½" to 5'-5" 1'-3½" Var.
D	½	19	5'-9"
E	½	19	2'-2"
F	½	18	10 @ 2'-6" 2-Ea.1'-6" to 2'-6" 4" Var.
O	½	4	9'-0"
P	½	2	22'-0"
J	½	4	2@4'-0" 2@6'-5"
M	½	4	8'-0"
N	½	4	2@2'-11" 2@7'-7"
H	½	3	One Each@18'-10" 19'-10" & 21'-0"
K	½	2	18'-4"
C	½	27	3'-2"

TOTAL WEIGHT-430 lbs.

H=4'-0" Backwall=5'-5⅞" Wingwall Slope - 6 to 12

Bars	Size	No.	Description
A	½	14	2-Ea.1'-8" to 7'-5" 1½" Var.
B	½	14	2-Ea.1'-8" to 7'-3⅝" 1¼" Var.
D	½	19	7'-8"
E	½	19	2'-2"
F	½	24	10 @ 2'-6" 2-Ea.1'-6" to 2'-6" 2" Var.
O	½	4	16'-2"
P	½	2	22'-0"
J	½	4	2@6'-0" 2@12'-0"
M	½	4	15'-1"
N	½	6	2@4'-4" 2@8'-4" 2@14'-4"
H	½	3	One Each@19'-4" 20'-2" & 21'-0"
K	½	2	18'-4"
C	½	33	3'-2

TOTAL WEIGHT-610 lbs.

H=6'-0" Backwall=5'-5⅞" Wingwall Slope - 9 to 12

Bars	Size	No.	Description
A	½	12	2-Ea. 2'-0" to 6'-11⅞" 1'-4⅞" Var.
B	½	12	2-Ea.1'-11" to 8'-7" 1'-4" Var.
D	½	19	9'-5"
E	½	19	3'-10"
F	½	22	10 @ 3'-0" 2-Ea.1'-6" to 2'-11½" 3½" Var.
O	½	4	14'-2"
P	½	2	22'-0"
J	½	6	2@4'-0" 2@8'-0" 2@11'-6"
M	½	4	14'-6"
N	½	8	2@2'-11" 2@5'-7" 2@10'-3" 2@12'-11"
H	½	4	One Each@17'-4" 18'-6" 19'-10" & 21'-0"
K	½	3	18'-4"
C	½	31	3'-4"

TOTAL WEIGHT-690 lbs.

H=8'-0" Backwall=3'-7" Wingwall Slope - 6 to 12

Bars	Size	No.	Description
A	½	18	2-Ea.1'-10" to 9'-6" 1½" Var.
B	½	18	2-Ea.1'-9" to 8'-5" 10" Var.
D	½	19	9'-0"
E	½	19	5'-2"
F	½	30	10 @ 4'-0" 2-Ea.1'-6" to 4'-1½" 3½" Var.
O	½	4	20'-4"
P	½	2	22'-0"
J	½	6	2@6'-0" 2@12'-0" 2@17'-9"
M	½	4	19'-9"
N	½	8	2@4'-4" 2@10'-4" 2@14'-4" 2@18'-4"
H	½	4	One Each@16'-0" 17'-8" 19'-4" & 21'-0"
K	½	3	18'-4"
C	½	37	3'-4"

TOTAL WEIGHT-870 lbs.

H=10'-0" Backwall=3'-7" Wingwall Slope - 9 to 12

Bars	Size	No.	Description
A	½	16	2-Ea.1'-8" to 10'-6" 1'-3" Var.
B	½	16	2-Ea.1'-7" to 9'-9" 1'-2" Var.
D	½	19	10'-4"
E	½	19	6'-6"
F	½	26	10 @ 5'-0" 2-Ea.1'-6" to 5'-0" 6" Var.
O	½	4	17'-0"
P	½	2	22'-0"
J	½	6	2@4'-0" 2@8'-0" 2@12'-0"
M	½	4	18'-0"
N	½	10	2@2'-11" 2@7'-7" 2@10'-3" 2@12'-11" 2@15'-7"
H	½	4	One Each@16'-0" 17'-8" 19'-4" & 21'-0"
K	½	4	18'-4"
C	½	35	3'-4"

TOTAL WEIGHT-810 lbs.

H=10'-0" Backwall=5'-5⅞" Wingwall Slope - 9 to 12

Bars	Size	No.	Description
A	½	18	2-Ea.1'-9" to 12'-2" 1'-3½" Var.
B	½	18	2-Ea.1'-8" to 11'-6" 1'-2¾" Var.
D	½	19	12'-1"
E	½	19	6'-6"
F	½	28	10 @ 5'-0" 2-Ea.1'-6" to 5'-0" 5¼" Var.
O	½	4	19'-6"
P	½	2	22'-0"
J	½	8	2@4'-0" 2@8'-0" 2@12'-0" 2@16'-0"
M	½	4	21'-2"
N	½	10	2@2'-11" 2@5'-7" 2@10'-3" 2@12'-11" 2@15'-7"
H	½	5	One Ea.@16'-4" 17'-9" 18'-2" 19'-7" & 21'-0"
K	½	4	18'-4"
C	½	37	3'-4"

TOTAL WEIGHT-1010 lbs.

H=4'-0" Backwall=3'-7" Wingwall Slope - 6 to 12

Bars	Size	No.	Description
A	½	10	2-Ea.1'-10½" to 5'-7½" 1'-2¼" Var.
B	½	10	2-Ea.1'-9" to 5'-3" 10½" Var.
D	½	19	5'-9"
E	½	19	2'-2"
F	½	22	10 @ 2'-6" 2-Ea.1'-6" to 2'-6½" 2½" Var.
O	½	4	12'-4"
P	½	2	22'-0"
J	½	4	2@6'-0" 2@9'-9"
M	½	4	10'-10"
N	½	4	2@4'-4" 2@10'-4"
H	½	3	One Each@18'-10" 19'-10" & 21'-0"
K	½	2	18'-4"
C	½	29	3'-2"

TOTAL WEIGHT-490 lbs.

H=6'-0" Backwall=3'-7" Wingwall Slope - 9 to 12

Bars	Size	No.	Description
A	½	10	2-Ea.1'-11" to 7'-5" 1'-4½" Var.
B	½	10	2-Ea.1'-9" to 6'-11" 1'-3½" Var.
D	½	19	7'-7"
E	½	19	3'-10"
F	½	20	10 @ 3'-0" 2-Ea.1'-6" to 3'-0" 4½" Var.
O	½	4	11'-4"
P	½	2	22'-0"
J	½	4	2@4'-0" 2@8'-0"
M	½	4	11'-4"
N	½	6	2@2'-11" 2@7'-7" 2@10'-3"
H	½	3	One Each@17'-0" 18'-6" & 21'-0"
K	½	3	18'-4"
C	½	29	3'-4"

TOTAL WEIGHT-575 lbs.

H=6'-0" Backwall=5'-5⅞" Wingwall Slope - 6 to 12

Bars	Size	No.	Description
A	½	18	2-Ea. 1'-8" to 9'-0" 11" Var.
B	½	18	2-Ea. 1'-7" to 8'-9" 10¾" Var.
D	½	19	9'-5"
E	½	19	3'-10"
F	½	28	10@3'-0" 2-Ea.1'-6" to 3'-0" 2¾" Var.
O	½	4	20'-2"
P	½	2	22'-0"
J	½	6	2@6'-0" 2@12'-0" 2@17'-6"
M	½	4	19'-7"
N	½	8	2@4'-4" 2@8'-4" 2@14'-4" 2@18'-4"
H	½	4	One Each@17'-4" 18'-6" 19'-10 & 21'-0"
K	½	3	18'-4"
C	½	37	3'-4"

TOTAL WEIGHT-820 lbs.

H=8'-0" Backwall=5'-5⅞" Wingwall Slope - 9 to 12

Bars	Size	No.	Description
A	½	16	2-Ea. 1'-7" to 10'-11" 1'-4" Var.
B	½	16	2-Ea. 1'-6" to 10'-3" 1'-3" Var.
D	½	19	10'-10"
E	½	19	5'-2"
F	½	26	10 @ 4'-0" 2-Ea.1'-6" to 4'-1½" 4½" Var.
O	½	4	16'-10"
P	½	2	22'-0"
J	½	6	2@4'-0" 2@8'-0" 2@12'-0"
M	½	4	17'-10"
N	½	10	2@2'-11" 2@5'-7" 2@10'-3" 2@12'-11" 2@15'-7"
H	½	4	One Each@16'-0" 17'-8" 19'-4" & 21'-0"
K	½	3	18'-4"
C	½	35	3'-4"

TOTAL WEIGHT-1010 lbs.

H=10'-0" Backwall=3'-7" Wingwall Slope - 6 to 12

Bars	Size	No.	Description
A	½	22	2-Ea.1'-9" to 10'-4" 10¾" Var.
B	½	22	2-Ea.1'-8" to 9'-7" 9½" Var.
D	½	19	10'-4"
E	½	19	6'-6"
F	½	34	10 @ 5'-0" 2-Ea.1'-6" to 5'-2" 4" Var.
O	½	4	24'-4"
P	½	2	22'-0"
J	½	6	2@6'-0" 2@12'-0" 2@18'-0"
M	½	4	24'-3"
N	½	10	2@4'-4" 2@10'-4" 2@14'-4" 2@18'-4" 2@22'-4"
H	½	4	One Each@16'-0" 17'-8" 19'-4" & 21'-0"
K	½	4	18'-4
C	½	41	3'-4"

TOTAL WEIGHT-1040 lbs.

H=10'-0" Backwall=5'-5⅞" Wingwall Slope - 6 to 12

Bars	Size	No.	Description
A	½	26	2-Ea.1'-8" to 12'-2" 10½" Var.
B	½	26	2-Ea.1'-7" to 11'-7" 10" Var.
D	½	19	12'-1"
E	½	19	6'-6"
F	½	36	10@5'-0" 2-Ea.1'-6" to 5'-0" 3½" Var.
O	½	4	28'-2"
P	½	2	22'-0"
J	½	8	2@6'-0" 2@12'-0" 2@18'-0" 2@24'-0"
M	½	4	28'-6"
N	½	10	2@4'-4" 2@8'-4" 2@14'-4" 2@18'-4" 2@22'-4"
H	½	5	One Ea.16'-4" 17'-9" 18'-2" 19'-7" & 21'-0"
K	½	4	18'-4"
C	½	45	3'-4"

TOTAL WEIGHT-1200 lbs.

H=4'-0" Backwall=5'-5⅞" Wingwall Slope 9 to 12

Bars	Size	No.	Description
A	½	10	2-Ea.1'-9" to 7'-3" 1'-4½" Var.
B	½	10	2-Ea.1'-9" to 7'-2" 1'-4¼" Var.
D	½	19	7'-8"
E	½	19	2'-2"
F	½	20	10 @ 2'-6" 2-Ea.1'-6" to 2'-6" 3" Var.
O	½	4	11'-6"
P	½	2	22'-0"
J	½	4	2@4'-0" 2@8'-0"
M	½	4	11'-2"
N	½	6	2@2'-11" 2@5'-7" 2@10'-3"
H	½	3	One Each@19'-4" 20'-2" & 21'-0"
K	½	2	18'-4"
C	½	29	3'-2"

TOTAL WEIGHT-525 lbs.

H=6'-0" Backwall=3'-7" Wingwall Slope - 6 to 12

Bars	Size	No.	Description
A	½	14	2-Ea.1'-10" to 7'-5½" 1¼" Var.
B	½	14	2-Ea.1'-8" to 6'-11" 10½" Var.
D	½	19	7'-7"
E	½	19	3'-10"
F	½	26	10 @ 3'-0" 2-Ea.1'-6" to 2'-11½" 2½" Var.
O	½	4	16'-4"
P	½	2	22'-0"
J	½	4	2@6'-0" 2@12'-0"
M	½	4	15'-4"
N	½	6	2@4'-4" 2@10'-4" 2@14'-4"
H	½	3	One Each@17'-0" 18'-6" & 21'-0"
K	½	3	18'-4"
C	½	33	3'-4"

TOTAL WEIGHT-650 lbs.

H=8'-0" Backwall=3'-7" Wingwall Slope - 9 to 12

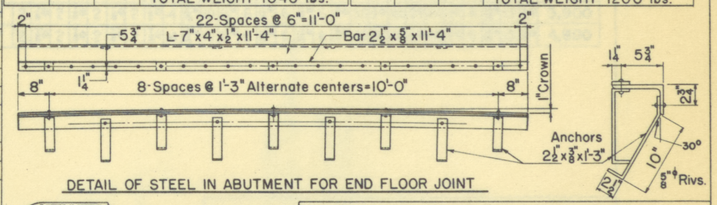
Bars	Size	No.	Description
A	½	14	2-Ea.1'-6" to 9'-0" 1'-3" Var.
B	½	14	2-Ea.1'-6" to 8'-6" 1'-2" Var.
D	½	19	9'-0"
E	½	19	5'-2"
F	½	24	10 @ 4'-0" 2-Ea.1'-6" to 4'-0" 5" Var.
O	½	4	14'-4"
P	½	2	22'-0"
J	½	6	2@4'-0" 2@8'-0" 2@11'-9"
M	½	4	14'-8"
N	½	8	2@2'-11" 2@7'-7" 2@10'-3" 2@12'-11"
H	½	4	One Each@16'-0" 17'-8" 19'-4" & 21'-0"
K	½	3	18'-4"
C	½	33	3'-4"

TOTAL WEIGHT-740 lbs.

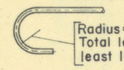
H=8'-0" Backwall=5'-5⅞" Wingwall Slope - 6 to 12

Bars	Size	No.	Description
A	½	22	2-Ea.1'-8" to 11'-3" 1½" Var.
B	½	22	2-Ea.1'-7" to 9'-11" 10" Var.
D	½	19	10'-10"
E	½	19	5'-2"
F	½	32	10 @ 4'-0" 2-Ea.1'-6" to 4'-0" 3" Var.
O	½	4	24'-2"
P	½	2	22'-0"
J	½	6	2@6'-0" 2@12'-0" 2@18'-0"
M	½	4	24'-1"
N	½	10	2@4'-4" 2@8'-4" 2@14'-4" 2@18'-4" 2@22'-4"
H	½	4	One Each@17'-9" 18'-2" 19'-7" & 21'-0"
K	½	3	18'-4"
C	½	41	3'-4"

TOTAL WEIGHT-1010 lbs.



DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINT



TYPICAL HOOK

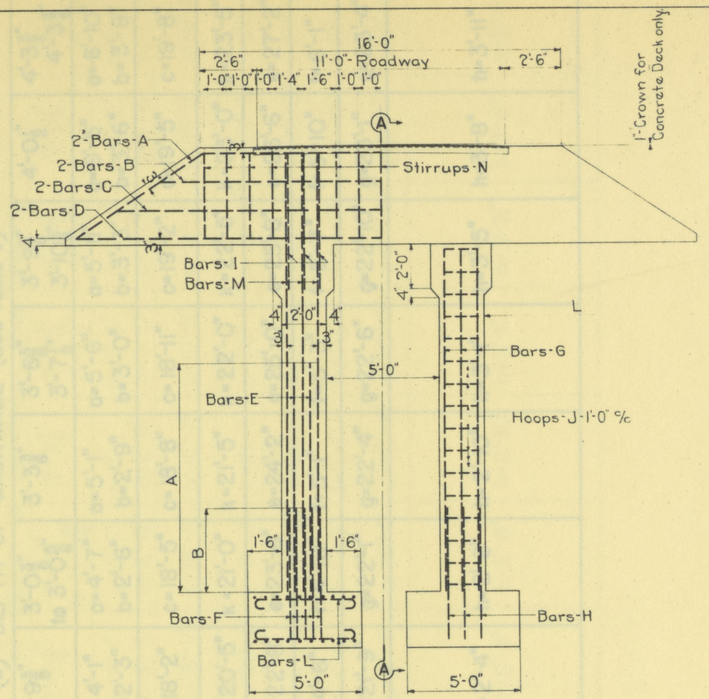
NOTE:- Lengths given are finished lengths. Shop to make proper allowance for bends.

These bending diagrams include reinforcing steel for full length wingwalls A, A' Omit reinforcing steel in Phantom Portion.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY
STANDARD GRAVITY ABUTMENT
DWG. NO. B-6201

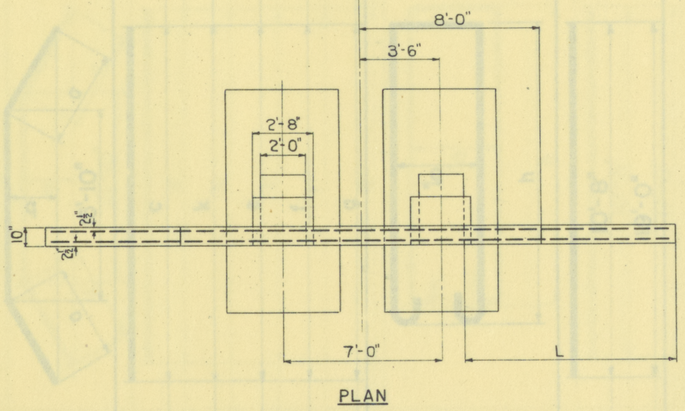
DESIGNED H.D.J. DRAWN L.T.S.
CHECKED N.W.W. TRACED L.T.S.
RECOMMENDED FOR APPROVAL DATE MAY, 1935.
APPROVED REGIONAL ENGINEER

R-7-DRAWING Nº B-6301

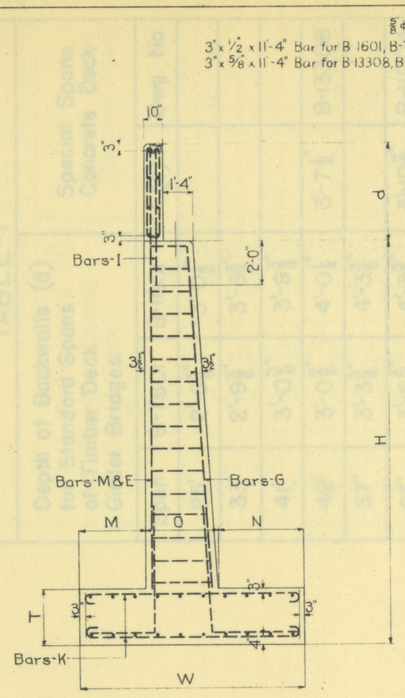


HALF SECTION SHOWING STEEL IN BACK OF COLUMN & PARAPET WALL

HALF ELEV. SHOWING STEEL IN FACE OF COLUMN.



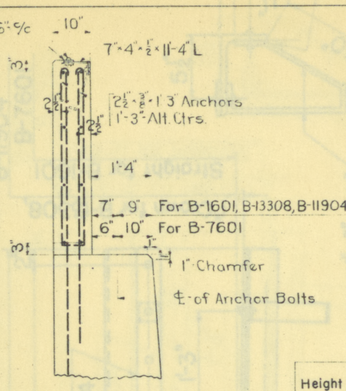
PLAN



SECTION-A A-

BASE PLAN

Height H	Bending Diagrams Dwg. No.
7'	
10'	
12'	
14	
16'	B-6305-D
18'	B-6304-D
20'	B-6303-D
22'	B-6302-D



SECTION OF PARAPET WALL

Height	Cubic Yards			Bags Cement
	Concrete	Sand	Stone	
7'	10	5	8	66
10'	12	6	10	79
12'	13	7	11	86
14	15	8	12	99
16'	17	9	14	112
18'	19	10	15	125
20'	22	11	17	145
22'	24	12	19	158

Span	Timber Deck H10-B-7601 d	Timber Deck H10-B-7601 L	Timber Deck B-7601 d	Timber Deck B-7601 L	Timber Deck H15-B-1601 d	Timber Deck H15-B-1601 L	Timber Deck B-1601 L	Concrete Deck SPECIAL SPANS d	Concrete Deck SPECIAL SPANS L	Concrete Deck With Dwg. No.
25'	2'-6 3/8"		6'-9"		3'-0 1/8"		7'-7"			
33'	2'-9 3/8"		7'-2"		3'-6 3/8"		8'-4"			
41'	3'-0 3/8"		7'-7"		3'-9 3/8"		8'-8"			
49'	3'-0 3/8"		7'-7"		4'-0 1/8"		9'-1"	3'-7 1/2"	8'-5"	B13308
57'	3'-3 3/8"		7'-11"		4'-3 3/8"		9'-5"			
65'	3'-6 3/8"		8'-4"		4'-3 5/8"		9'-5"	3'-10 5/8"	8'-10"	B11904

Height H	Dimensions Length W	Toe N	Heel M	Shaft O	Thickness T	Lap B	Bar Length A
7'	6'-0"	2'-2"	1'-6"	2'-4"	2'-0"	3'-0"	5'-0"
10'	7'-0"	2'-6"	2'-0"	2'-6"	2'-0"	3'-0"	7'-0"
12'	7'-9"	2'-10"	2'-3"	2'-8"	2'-3"	3'-4"	7'-6"
14'	8'-6"	3'-2"	2'-6"	2'-10"	2'-3"	3'-4"	7'-6"
16'	9'-3"	3'-6"	2'-9"	3'-0"	2'-6"	3'-4"	9'-0"
18'	10'-0"	3'-10"	3'-0"	3'-2"	2'-6"	3'-9"	9'-3"
20'	10'-9"	4'-2"	3'-3"	3'-4"	2'-9"	3'-9"	10'-3"
22'	11'-6"	4'-6"	3'-6"	3'-6"	2'-9"	4'-2"	10'-8"

Height-H	Number and Size of Bars Bars-A	Bars-B	Bars-C	Bars-D	Bars-E	Bars-F	Bars-G	Bars-H	Bars-I	Bars-J	Bars-K	Bars-L	Bars-M	Bars-N	Reinf'g Steel Pounds
	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	Nº Size	
7'	2 5/8ϕ	2 5/8ϕ	2 5/8ϕ	2 5/8ϕ	2 5/8ϕ	4 5/8ϕ	10 5/8ϕ	6 5/8ϕ	6 5/8ϕ	6 3/4ϕ	10 1/2ϕ	40 5/8ϕ	24 1/2ϕ	6 7/8ϕ	13 1/2ϕ	1,700
10'	2 7/8ϕ	2 5/8ϕ	2 1"ϕ	2 5/8ϕ	2 5/8ϕ	4 5/8ϕ	10 7/8ϕ	6 5/8ϕ	6 5/8ϕ	6 3/4ϕ	16 1/2ϕ	40 5/8ϕ	28 1/2ϕ	6 7/8ϕ	13 1/2ϕ	2,000
12'	2 7/8ϕ	2 5/8ϕ	2 1"ϕ	2 5/8ϕ	2 5/8ϕ	4 1"ϕ	10 1"ϕ	6 1"ϕ	6 1"ϕ	6 3/4ϕ	20 1/2ϕ	40 5/8ϕ	32 1/2ϕ	6 1"ϕ	13 1/2ϕ	2,300
14'	2 7/8ϕ	2 5/8ϕ	2 1"ϕ	2 5/8ϕ	2 5/8ϕ	4 1"■	10 1"■	6 1"■	6 1"■	6 3/4ϕ	24 1/2ϕ	40 5/8ϕ	36 1/2ϕ	6 1"■	13 1/2ϕ	2,600
16'	2 7/8ϕ	2 5/8ϕ	2 1"ϕ	2 5/8ϕ	2 5/8ϕ	4 1"■	10 1"■	6 1"■	6 1"■	6 3/4ϕ	28 1/2ϕ	40 5/8ϕ	40 1/2ϕ	6 1"■	13 1/2ϕ	3,000
18'	2 7/8ϕ	2 5/8ϕ	2 1"ϕ	2 5/8ϕ	2 5/8ϕ	4 1 1/8"■	10 1 1/8"■	6 1 1/8"■	6 1 1/8"■	6 3/4ϕ	32 1/2ϕ	40 5/8ϕ	40 1/2ϕ	6 1 1/8"■	13 1/2ϕ	3,600
20'	2 7/8ϕ	2 5/8ϕ	2 1"ϕ	2 5/8ϕ	2 5/8ϕ	4 1 1/8"■	10 1 1/8"■	6 1 1/8"■	6 1 1/8"■	6 3/4ϕ	36 1/2ϕ	40 5/8ϕ	44 1/2ϕ	6 1 1/8"■	13 1/2ϕ	3,900
22'	2 7/8ϕ	2 5/8ϕ	2 1"ϕ	2 5/8ϕ	2 5/8ϕ	4 1 1/4"■	10 1 1/4"■	6 1 1/4"■	6 1 1/4"■	6 3/4ϕ	40 1/2ϕ	40 5/8ϕ	48 1/2ϕ	6 1 1/4"■	13 1/2ϕ	4,800

NOTE

Masonry surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.

Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

SPECIFICATIONS

Reinforcing Bars – F.S.-QQ-B-71
Type B- Grade I (Deformed Structural)
Class A- (Open Hearth Steel)
Concrete- Class A-1½
Chamfer all exposed edges 1"

DESIGN DATA

Horizontal Surcharge 300# per sq. ft.
f_s = 16000# per sq. in.
f_c = 650# per sq. in. n = 15
This abutment is suitable for foundation of well compacted clay or gravel.

Rev. 9-27-35
Rev. 7-25-35 As to width of Capital as shown on plan.
Rev. 7-19-35 To show chamfer, and Anchor Bolt Note.

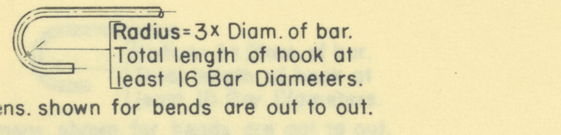
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD OPEN ABUTMENTS
FOR BEAM SPANS
11'-ROADWAY--HEIGHT-7'-TO-22'
MODIFICATION OF DWG. NO. B-2602

DESIGNED M.W.W.
CHECKED H.D.J.
RECOMMENDED FOR APPROVAL E.H.M.
DRAWN H.D.J.
TRACED L.T.S. new
DATE APRIL, 1935.
APPROVED L.B.C. REGIONAL ENGINEER

Bars	Size	No.	Description	(d) = DEPTH OF BACKWALL (See Table I)							
				2'-6 3/8"	2'-9 3/8"	3'-0 3/8" to 3'-0 5/8"	3'-3 3/8"	3'-6 3/8" 3'-7 1/2"	3'-9 3/8" 3'-10 5/8"	4'-0 1/2"	4'-3 3/8" 4'-3 5/8"
A	7/8"φ	2	b, a, a, 15'-10"	a=3'-7" b=2'-0"	a=4'-1" b=2'-3"	a=4'-7" b=2'-6"	a=5'-1" b=2'-9"	a=5'-6" b=3'-0"	a=5'-11" b=3'-3"	a=6'-5" b=3'-6"	a=6'-10" b=3'-9"
B	7/8"φ	2	c	c=17'-10"	c=18'-2"	c=18'-5"	c=18'-8"	c=18'-11"	c=19'-2"	c=19'-5"	c=19'-8"
C	7/8"φ	2	k	k=19'-10"	k=20'-5"	k=21'-0"	k=21'-5"	k=22'-0"	k=22'-5"	k=23'-0"	k=23'-5"
D	7/8"φ	2	e	e=21'-10"	e=22'-8"	e=23'-6"	e=24'-2"	e=25'-0"	e=25'-8"	e=26'-6"	e=27'-2"
I	3/4"φ	6	f	f=4'-3"	f=4'-6"	f=4'-10"	f=5'-1"	f=5'-3"	f=5'-7"	f=5'-10"	f=6'-1"
M	1 1/4"■	6	g	g=21'-6"	g=21'-9"	g=22'-1"	g=22'-4"	g=22'-6"	g=22'-10"	g=23'-1"	g=23'-4"
N	1/2"φ	13	5", h	h=2'-1"	h=2'-4"	h=2'-8"	h=2'-10"	h=3'-1"	h=3'-5"	h=3'-8"	h=3'-11"
E	1 1/4"■	4	10'-8"								
G	1 1/4"■	6	19'-0"								
F	1 1/4"■	10	3'-7 1/2", 4'-7 1/2", Bars-F, Bars-H, 6'-7"								
H	1 1/4"■	6									
J	1/2"φ	40	1'-7", 10", 10", 2-Each-1'-7 3/4" to 3'-0 3/8" - 7/8"-Variance								
K	7/8"φ	40	Bars-K 11'-0"								
L	1/2"φ	48	Bars-L 4'-6"								

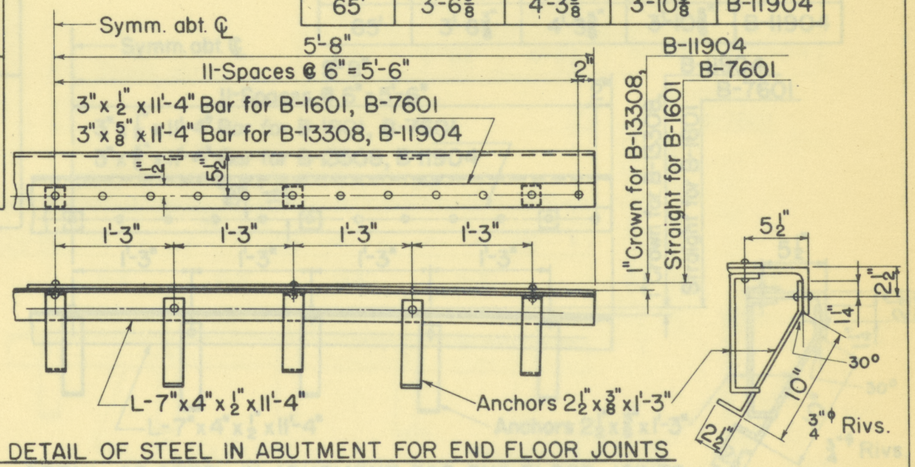
TABLE-I

Depth of Backwalls (d) for Standard Spans of Timber Deck Girder Bridges.			Special Spans Concrete Deck	
Span	B-7601	B-1601	(d)	Dwg. No.
25'	2'-6 3/8"	3'-0 1/2"		
33'	2'-9 3/8"	3'-6 3/8"		
41'	3'-0 3/8"	3'-9 3/8"		
49'	3'-0 5/8"	4'-0 1/2"	3'-7 1/2"	B-13308
57'	3'-3 3/8"	4'-3 3/8"		
65'	3'-6 3/8"	4'-3 5/8"	3'-10 5/8"	B-11904



Dimens. shown for bends are out to out.

TYPICAL HOOK



DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINTS

NOTE:- Lengths given are finished lengths.
Shop to make proper allowance for bends.

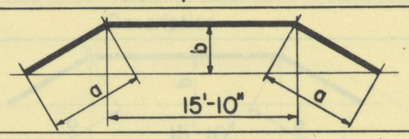
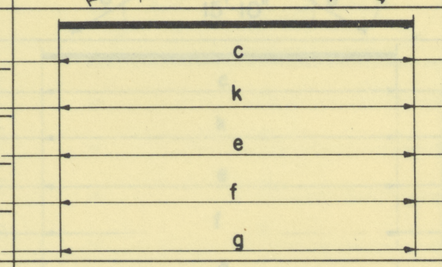
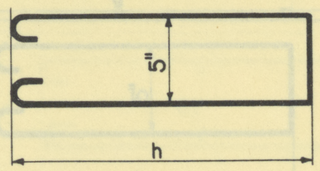
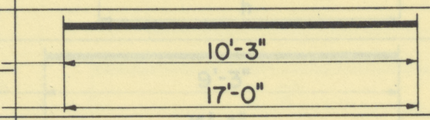
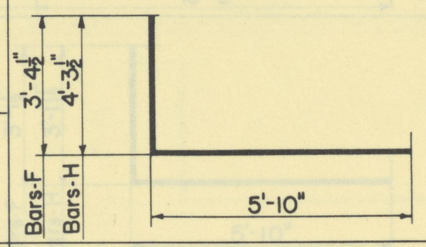
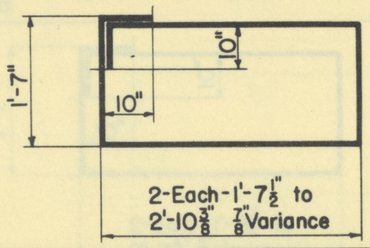
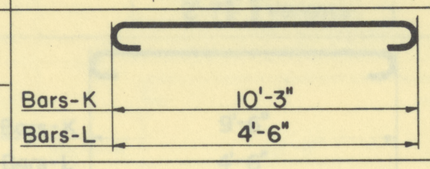
APPROX. WEIGHT OF STEEL···4600#

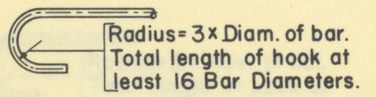
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BENDING DIAGRAM

TO ACCOMPANY ABUTMENT DWG. NO. B-6301
HEIGHT-22' WIDTH OF PARAPET-16'
FOR BEAM BRIDGES DWGS. B-1601 & B-7601

DESIGNED N.W.W. DRAWN L.T.S.
CHECKED H.D.J. TRACED L.T.S. NWW
RECOMMENDED FOR APPROVAL E.E.M. DATE JUNE, 1935.
APPROVED REGIONAL ENGINEER

Bars	Size	No.	Description	(d) = DEPTH OF BACKWALL (See Table - I)							
A	7/8" ϕ	2		2'-6 3/8"	2'-9 3/8"	3'-0 3/8" to 3'-0 5/8"	3'-3 3/8"	3'-6 3/8" 3'-7 1/2"	3'-9 3/8" 3'-10 5/8"	4'-0 1/2"	4'-3 3/8" 4'-3 5/8"
				a= 3'-7" b= 2'-0"	a= 4'-1" b=2'-3	a=4'-7" b= 2'-6"	a=5'-1" b=2'-9"	a=5'-6" b=3'-0"	a=5'-11" b=3'-3"	a=6'-5" b= 3'-6"	a=6'-10" b=3'-9"
B	7/8" ϕ	2		c=17'-10"	c=18'-2"	c=18'-5"	c=18'-8"	c=18'-11"	c=19'-2"	c=19'-5"	c=19'-8"
C	7/8" ϕ	2		k=19'-10"	k=20'-5"	k=21'-0"	k=21'-5"	k=22'-0"	k=22'-5"	k=23'-0"	k=23'-5"
D	7/8" ϕ	2		e=21'-10"	e=22'-8"	e=23'-6"	e=24'-2"	e=25'-0"	e=25'-8"	e=26'-6"	e=27'-2"
I	3/4" ϕ	6		f=4'-3"	f=4'-6"	f=4'-10"	f=5'-1"	f=5'-3"	f=5'-7"	f=5'-10"	f=6'-1"
M	1 1/8" ■	6		g=19'-6"	g=19'-9"	g=20'-1"	g=20'-4"	g=20'-6"	g=20'-10"	g=21'-1"	g=21'-4"
N	1/2" ϕ	13		h= 2'-1"	h=2'-4"	h=2'-8"	h=2'-10"	h=3'-1"	h=3'-5"	h=3'-8"	h=3'-11"
E	1 1/8" ■	4									
G	1 1/8" ■	6									
F	1 1/8" ■	10									
H	1 1/8" ■	6									
J	1/2" ϕ	36									
K	3/4" ϕ	40									
L	1/2" ϕ	44									



Dimens. shown for bends are out to out.

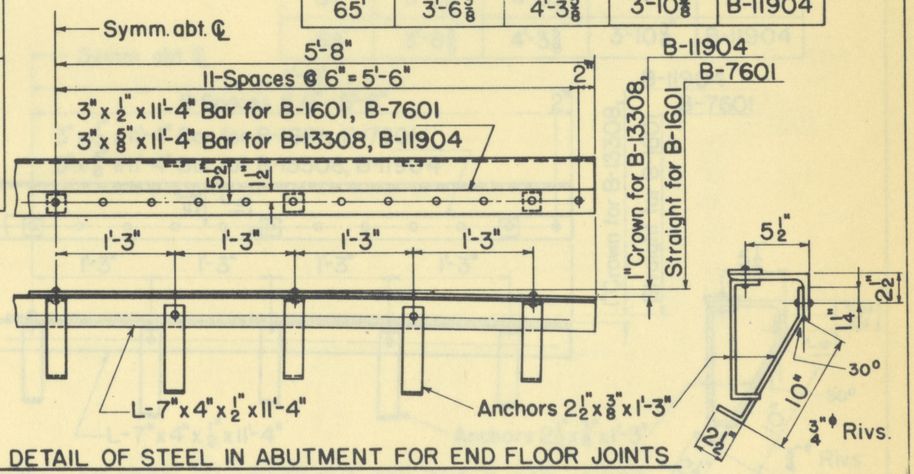
TYPICAL HOOK

NOTE:- Lengths given are finished lengths.
Shop to make proper allowance for bends.

APPROX. WEIGHT OF STEEL···3500#

TABLE-I

Depth of Backwalls (d) for Standard Spans of Timber Deck Girder Bridges.			Special Spans Concrete Deck	
Span	B-7601	B-1601	(d)	Dwg. No.
25'	2'-6 3/8"	3'-0 1/2"		
33'	2'-9 3/8"	3'-6 3/8"		
41'	3'-0 3/8"	3'-9 3/8"		
49'	3'-0 5/8"	4'-0 1/2"	3'-7 1/2"	B-13308.
57'	3'-3 3/8"	4'-3 3/8"		
65'	3'-6 3/8"	4'-3 5/8"	3'-10 5/8"	B-11904



DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINTS

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. NO. B-6301
HEIGHT-20' WIDTH OF PARAPET-16'
FOR BEAM BRIDGES DWGS. B-1601 & B-7601

DESIGNED N.W.W. DRAWN L.T.S.
CHECKED H.D.J. TRACED L.T.S. n w w
RECOMMENDED FOR APPROVAL E.d.M. DATE JUNE, 1935
APPROVED J. Dort REGIONAL ENGINEER

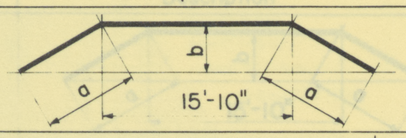
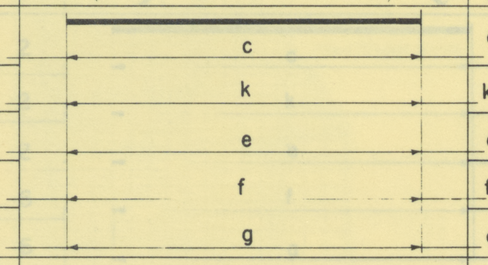
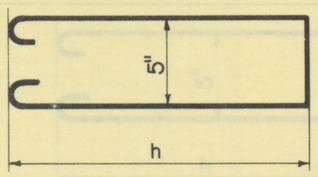
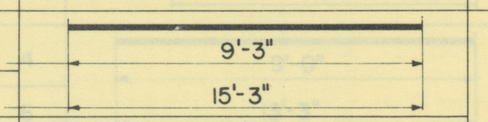
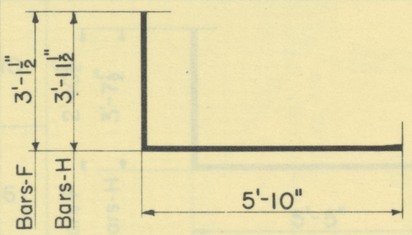
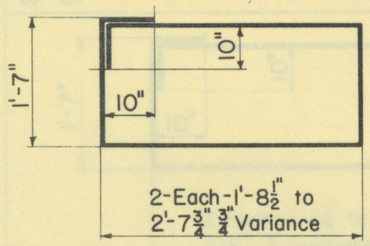
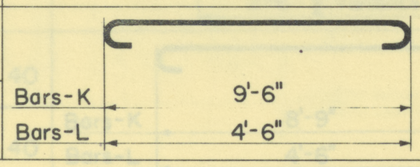
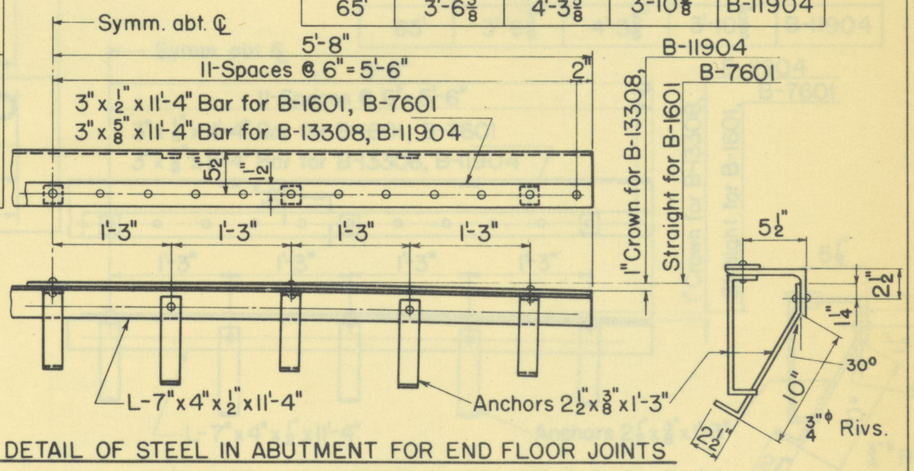
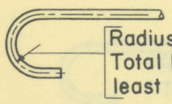
Bars	Size	No.	Description	(d) = DEPTH OF BACKWALL (See Table - I)							
A	7/8"φ	2		2'-6 3/8"	2'-9 3/8"	3'-0 3/8" to 3'-0 5/8"	3'-3 3/8"	3'-6 3/8" 3-7 1/2"	3'-9 3/8" 3'-10 5/8"	4'-0 1/2"	4'-3 3/8" 4'-3 5/8"
				a=3'-7" b=2'-0"	a=4'-1" b=2'-3"	a=4'-7" b=2'-6"	a=5'-1" b=2'-9"	a=5'-6" b=3'-0"	a=5'-11" b=3'-3"	a=6'-5" b=3'-6"	a=6'-10" b=3'-9"
B	7/8"φ	2		c=17'-10"	c=18'-2"	c=18'-5"	c=18'-8"	c=18'-11"	c=19'-2"	c=19'-5"	c=19'-8"
C	7/8"φ	2		k=19'-10"	k=20'-5"	k=21'-0"	k=21'-5"	k=22'-0"	k=22'-5"	k=23'-0"	k=23'-5"
D	7/8"φ	2		e=21'-10"	e=22'-8"	e=23'-6"	e=24'-2"	e=25'-0"	e=25'-8"	e=26'-6"	e=27'-2"
I	3/4"φ	6		f=4'-3"	f=4'-6"	f=4'-10"	f=5'-1"	f=5'-3"	f=5'-7"	f=5'-10"	f=6'-1"
M	1 1/8"■	6		g=17'-9"	g=18'-0"	g=18'-4"	g=18'-7"	g=18'-9"	g=19'-1"	g=19'-4"	g=19'-7"
N	1/2"φ	13		h=2'-1"	h=2'-4"	h=2'-8"	h=2'-10"	h=3'-1"	h=3'-5"	h=3'-8"	h=3'-11"
E	1 1/8"■	4									
G	1 1/8"■	6									
F	1 1/8"■	10									
H	1 1/8"■	6									
J	1/2"φ	32									
K	3/4"φ	40									
L	1/2"φ	40									

TABLE-I

Depth of Backwalls (d) for Standard Spans of Timber Deck Girder Bridges.			Special Spans Concrete Deck	
Span	B-7601	B-1601	(d)	Dwg. No.
25'	2'-6 3/8"	3'-0 1/2"		
33'	2'-9 3/8"	3'-6 3/8"		
41'	3'-0 3/8"	3'-9 3/8"		
49'	3'-0 5/8"	4'-0 1/2"	3'-7 1/2"	B-13308
57'	3'-3 3/8"	4'-3 3/8"		
65'	3'-6 3/8"	4'-3 5/8"	3'-10 5/8"	B-11904



DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINTS



Radius = 3 × Diam. of bar.
Total length of hook at least 16 Bar Diameters.

Dimens. shown for bends are out to out.

TYPICAL HOOK

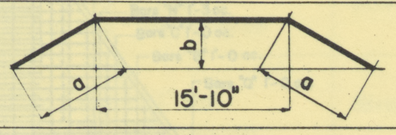
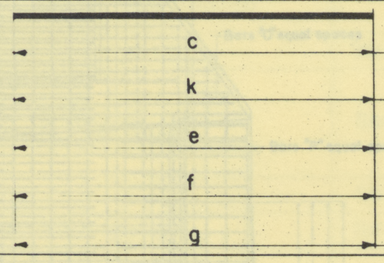
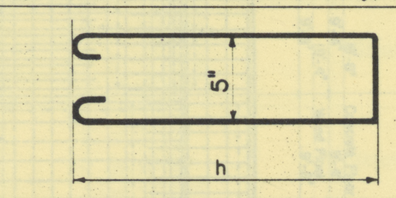
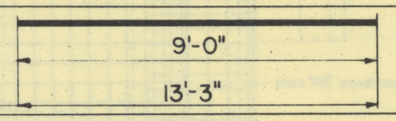
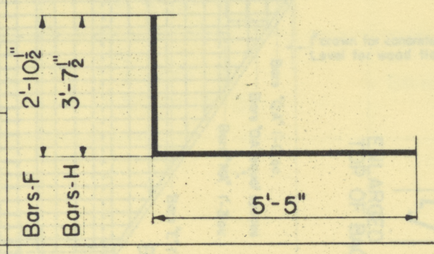
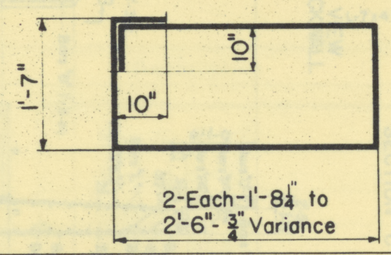
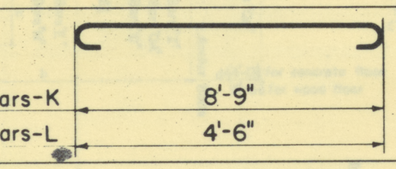
NOTE:- Lengths given are finished lengths.
Shop to make proper allowance for bends.

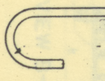
APPROX. WEIGHT OF STEEL--3300#

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. NO. B-6301
HEIGHT-18' WIDTH OF PARAPET-16'
FOR BEAM BRIDGES DWGS. B-1601 & B-7601

DESIGNED N.W.W.
CHECKED H.D.J.
RECOMMENDED FOR APPROVAL E.G.M.
DRAWN L.T.S.
TRACED L.T.S. NWW
DATE JUNE, 1935
APPROVED ... REG. ENG.

Bars	Size	No.	Description	(d) = DEPTH OF BACKWALL (See Table - I)							
				2'-6 3/8"	2'-9 3/8"	3'-0 3/8" to 3'-0 5/8"	3'-3 3/8"	3'-6 3/8" 3'-7 1/2"	3'-9 3/8" 3'-10 5/8"	4'-0 1/2"	4'-3 3/8" 4'-3 5/8"
A	7/8"φ	2		a=3'-7" b=2'-0"	a=4'-1" b=2'-3"	a=4'-7" b=2'-6"	a=5'-1" b=2'-9"	a=5'-6" b=3'-0"	a=5'-11" b=3'-3"	a=6'-5" b=3'-6"	a=6'-10" b=3'-9"
B	7/8"φ	2		c=17'-10"	c=18'-2"	c=18'-5"	c=18'-8"	c=18'-11"	c=19'-2"	c=19'-5"	c=19'-8"
C	7/8"φ	2		k=19'-10"	k=20'-5"	k=21'-0"	k=21'-5"	k=22'-0"	k=22'-5"	k=23'-0"	k=23'-5"
D	7/8"φ	2		e=21'-10"	e=22'-8"	e=23'-6"	e=24'-2"	e=25'-0"	e=25'-8"	e=26'-6"	e=27'-2"
I	3/4"φ	6		f=4'-3"	f=4'-6"	f=4'-10"	f=5'-1"	f=5'-3"	f=5'-7"	f=5'-10"	f=6'-1"
M	1"■	6		g=15'-9"	g=16'-0"	g=16'-4"	g=16'-7"	g=16'-9"	g=17'-1"	g=17'-4"	g=17'-7"
N	1/2"φ	13		h=2'-1"	h=2'-4"	h=2'-8"	h=2'-10"	h=3'-1"	h=3'-5"	h=3'-8"	h=3'-11"
E	1"■	4									
G	1"■	6									
F	1"■	10									
H	1"■	6									
J	1/2"φ	28									
K	3/4"φ	40									
L	1/2"φ	40									



Radius = 3 × Diam. of bar.
Total length of hook at least 16 Bar Diameters.

Dimens. shown for bends are out to out.

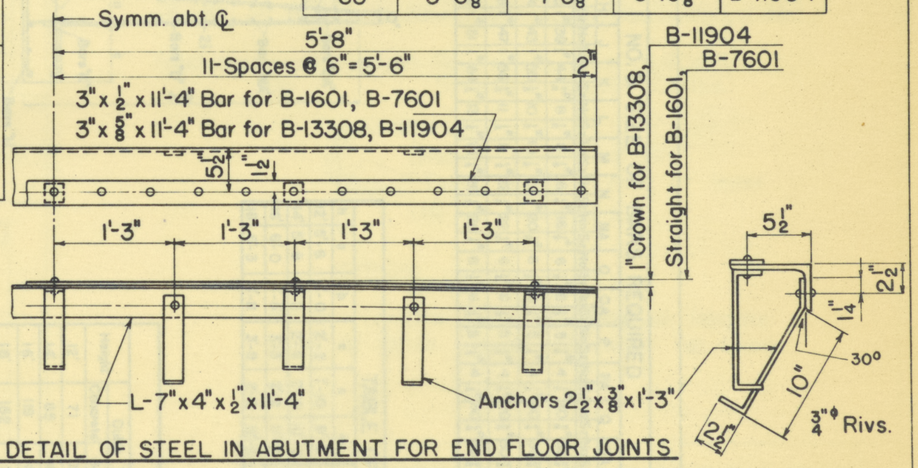
TYPICAL HOOK

NOTE:- Lengths given are finished lengths.
Shop to make proper allowance for bends.

APPROX. WEIGHT OF STEEL··· 2750#

TABLE-I

Depth of Backwalls (d) for Standard Spans of Timber Deck Girder Bridges.			Special Spans Concrete Deck	
Span	B-7601	B-1601	(d)	Dwg. No.
25'	2'-6 3/8"	3'-0 1/2"		
33'	2'-9 3/8"	3'-6 3/8"		
41'	3'-0 3/8"	3'-9 3/8"		
49'	3'-0 5/8"	4'-0 1/2"	3'-7 1/2"	B-13308
57'	3'-3 3/8"	4'-3 3/8"		
65'	3'-6 3/8"	4'-3 5/8"	3'-10 5/8"	B-11904



DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINTS

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. NO. B-6301
HEIGHT-16' WIDTH OF PARAPET-16'
FOR BEAM BRIDGES DWGS. B-1601 & B-7601

DESIGNED N.W.W. DRAWN L.T.S.
CHECKED H.D.J. TRACED L.T.S. N.W.W.
RECOMMENDED FOR APPROVAL E.E.M. DATE JUNE, 1935
APPROVED REGIONAL ENGINEER

R-7-DRAWING Nº B-6501

NO. & SIZE OF BARS REQUIRED

h	A		B		C		D		E		F		G		H		J		K		L		M		N		NA		O		OA		P		PA		Q		QA		R		S		T		U		V		W		X		Y		Z	
	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz	No	Sz
12'	12	¾"	14	1"	26	1"	20	½"	24	½"	12	¾"	12	¾"	40	1"	39	1"	44	½"	8	½"	8	½"	16	½"	16	½"	6	½"	6	½"	5	½"	4	½"	30	⅝"	30	⅝"	12	⅞"	12	¾"	16	1"	16	⅞"	30	1"	30	⅞"	14	½"	28	½"	14	½"
14'	16	⅞"	18	1"	26	1"	26	½"	24	½"	16	⅞"	16	⅞"	44	1"	43	1"	50	½"	10	½"	10	½"	20	½"	20	½"	6	½"	6	½"	5	½"	4	½"	30	⅝"	30	⅝"	16	1"	16	⅞"	20	1"	20	1"	30	1"	30	1"	14	½"	28	½"	14	½"
16'	20	⅞"	22	1"	26	1"	34	½"	24	½"	20	⅞"	20	⅞"	48	1"	47	1"	58	½"	11	½"	11	½"	22	½"	22	½"	6	½"	6	½"	5	½"	4	½"	30	⅝"	30	⅝"	20	1"	20	1"	24	1"	24	1"	30	1"	30	1"	14	½"	28	½"	14	½"
18'	24	⅞"	26	1"	26	1"	40	½"	24	½"	24	⅞"	26	⅞"	52	1"	51	1"	64	½"	13	½"	13	½"	26	½"	26	½"	6	½"	6	½"	5	½"	4	½"	30	⅝"	30	⅝"	24	1"	24	1"	28½	1"	28	1"	30	1"	30	1"	14	½"	28	½"	14	½"

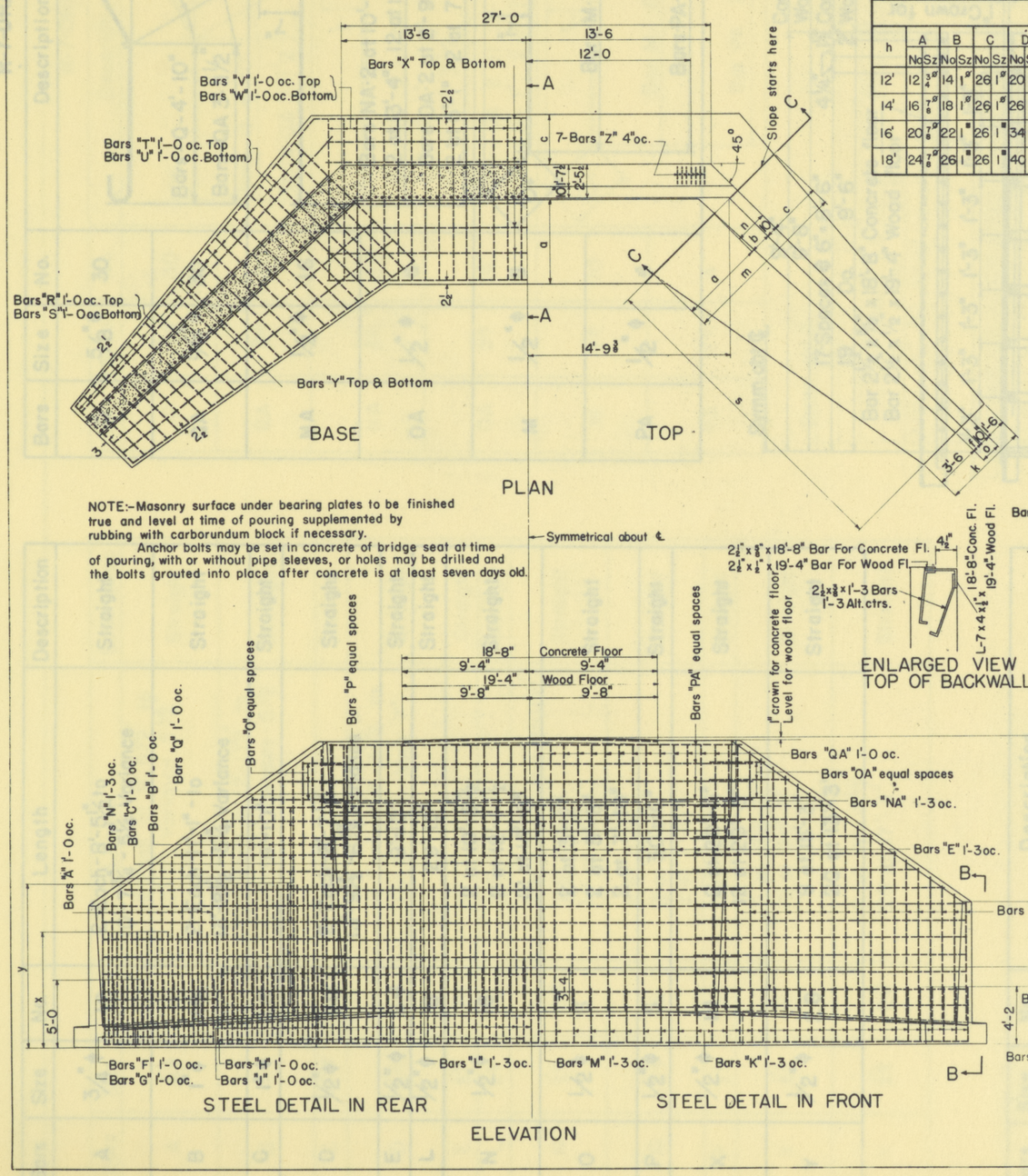


TABLE OF DIMENSIONS

h	a	b	c	n	m	f	o	k	s	t	x	y
12'	5'-6	1'-0	2'-2	1'-10	9'-6	7½	1'-5½	6'-5½	12'-0	2'-0	8'-6	9'-6
14'	5'-9	1'-2	2'-6	2'-0	10'-3	7¾	1'-5¾	6'-5¾	16'-0	2'-0	9'-0	10'-0
16'	6'-0	1'-5	3'-3	2'-3	11'-6	8½	1'-6½	6'-6½	20'-0	2'-3	10'-0	10'-9
18'	6'-3	1'-8	3'-9	2'-6	12'-6	9	1'-7	6'-7	24'-0	2'-6	10'-6	11'-3

QUANTITIES

Height	Cubic Yards			Bags of	Reinforcing Steel	
	Concrete	Sand	Stone	Cement	Concrete Floor	Wood Floor
12'	71	36	57	466		
14'	85	43	68	558		
16'	119	60	95	781	15,500	
18'	152	76	122	997	18,700	

BENDING DIAGRAMS

H	Dwg. No.
12'	B-6502-D
14'	B-6503-D
16'	B-6504-D
18'	B-6505-D

SPECIFICATIONS

Reinforcing Bars - F.S.Q.Q.-B-71. Type B - Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete - Class A - 1½
Chamfer all exposed edges 1"

DESIGN DATA

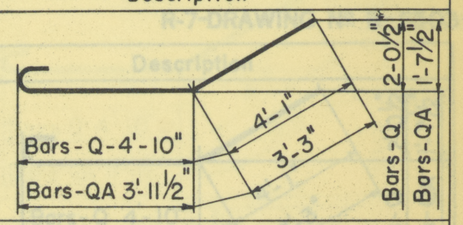
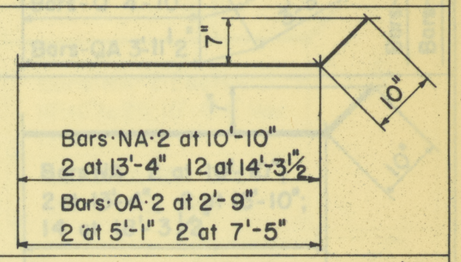
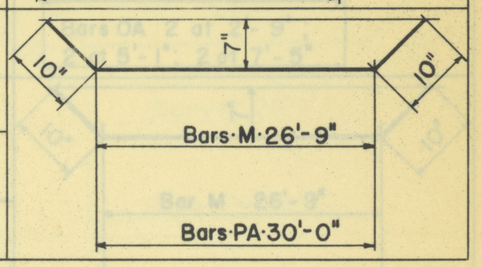
Horizontal Surcharge 300#/sq.ft.
fs = 16000#/sq.in.
fc = 650#/sq.in. - n = 15
This abutment is suitable for foundation of well compacted clay or gravel.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REINFORCED CONCRETE ABUTMENT
FOR TRUSS BRIDGE DWG. B-6901
19' ROADWAY HEIGHTS 12 FT. TO 18 FT.

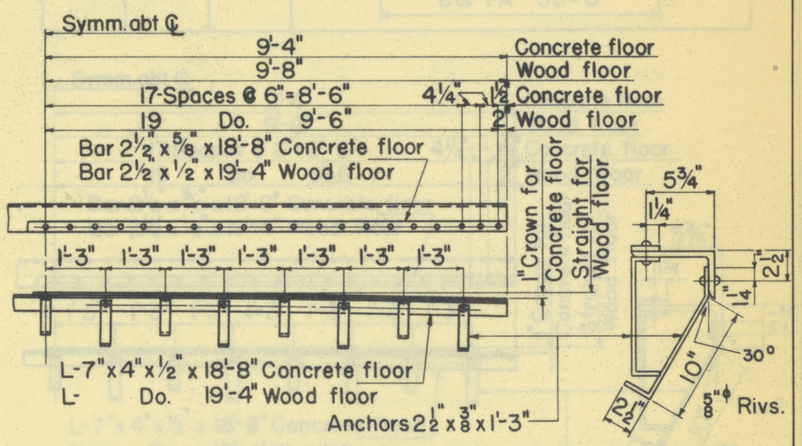
DESIGNED H.D.J.
CHECKED
RECOMMENDED FOR APPROVAL E.G.M.
DRAWN H.D.J.
TRACED H.D.J.
DATE APRIL 1935
APPROVED REGIONAL ENGINEER

Revised 2-11-36 A.H.B.

Bars	Size	No.	Length	Description
A	3/4" ϕ	12	2-Each-8'-5 1/2" to 10'-7 3/4" - 5 1/4" Variance	Straight
B	1" ϕ	14	2-Each-11'-1" - to 13'-8 1/2" - 5 1/4" Variance	Straight
C	1" ϕ	26	9'-10"	Straight
D	1/2" ϕ	20	2-Each-8'-7 1/2" 13'-9 1/2" - 6 7/8" Variance	Straight
E	1/2" ϕ	24	9'-10"	Straight
L	1/2" ϕ	8	29'-10"	Straight
N	1/2" ϕ	16	2 at 10'-5 1/2" 2 at 12'-11 1/2" 12 at 15'-0"	Straight
O	1/2 ϕ	6	2 at 3'-2" 2 at 5'-6" 2 at 7'-10"	Straight
P	1/2" ϕ	5	30'-10"	Straight
X	1/2" ϕ	14	2 at 29'-5" 12 at 29'-3"	Straight
Y	1/2" ϕ	28	8 at 15'-3" 20 at 13'-3'	Straight

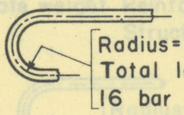
Bars	Size	No.	Description
Q	5/8" ϕ	30	
QA	5/8" ϕ	30	
NA	1/2" ϕ	16	
OA	1/2" ϕ	6	
M	1/2" ϕ	8	
PA	1/2" ϕ	4	

Bars	Size	No.	Description
F	3/4" ϕ	12	Bars-F- 4'-10"
G	3/4" ϕ	12	Bars-G- 8'-4"
H	1" ϕ	40	Bars-H- 5'-2"
J	1" ϕ	39	Bars-J- 9'-4"
K	1/2" ϕ	44	Bars-K- 4'-0"
R	7/8" ϕ	12	Bars R 2-Each-6'-0 1/2" to 7'-2 7/8" - 2 7/8" Variance
S	3/4" ϕ	12	Bars S 2-Each-6'-0 1/2" to 7'-2 7/8" - 2 7/8" Variance
T	1" ϕ	16	Bars T 2-Each-7'-5 3/4" to 9'-1 7/8" - 2 7/8" Variance
U	7/8" ϕ	16	Bars U 2-Each-7'-5 3/4" to 9'-1 7/8" - 2 7/8" Variance
V	1" ϕ	30	Bars V- 9'-2"
W	7/8" ϕ	30	Bars W- 9'-2"
Z	1/2" ϕ	14	Bars Z- 1'-4"



DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINT

Total approximate weight Reinforcing Steel = 8,600 lbs.
Do. Structural Steel = 500 lbs.



TYPICAL HOOK

NOTE: - Lengths given are finished lengths.
Shop to make proper allowance for bends.

Revised 2-11-36 A.H.B.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BENDING DIAGRAM

REINFORCED CONCRETE ABUTMENT-DWG. B-6501

19'-REINFORCED CONCRETE DECK-HEIGHT-12'

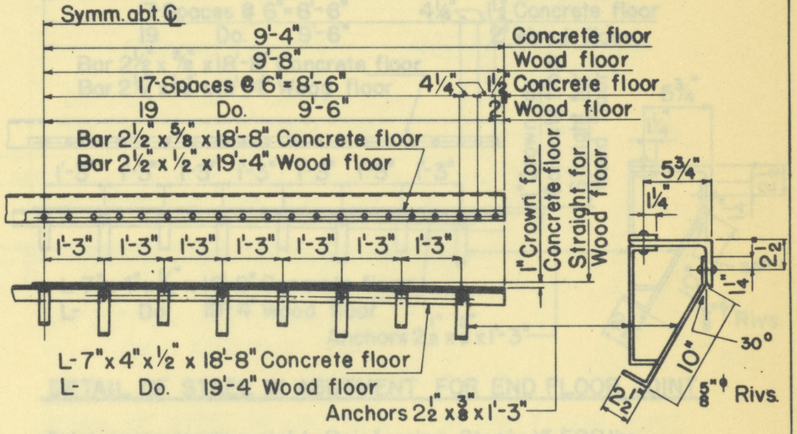
DESIGNED H.D.J. DRAWN L.T.S.
CHECKED N.W.W. TRACED L.T.S. C.E.J.
RECOMMENDED FOR APPROVAL E & M DATE MAY, 1935
APPROVED J.A. Dost REGIONAL ENGINEER

R-7-DRAWING Nº B-6503-D

Bars	Size	No.	Length	Description
A	$\frac{7}{8}$"ϕ	16	2 Each at 8'-5½" to 11'-8"; Variance 5½"	Straight
B	1"ϕ	18	2 Each at 12-1½" to 15'-9½"; Variance 5½"	Straight
C	1"ϕ	26	11'-10"	Straight
D	$\frac{1}{2}$"ϕ	26	2 Each at 8'-9½" to 15'-9½"; Variance 7"	Straight
E	$\frac{1}{2}$"ϕ	24	11'-10"	Straight
L	$\frac{1}{2}$"ϕ	10	29'-10"	Straight
N	$\frac{1}{2}$"ϕ	20	2 at 10'-5½"; 2 at 12'-11½"; 2 at 15'-5½"; 14 at 19'-0"	Straight
O	$\frac{1}{2}$"ϕ	6	2 at 3'-2" 2 at 5'-6" 2 at 7'-10"	Straight
P	$\frac{1}{2}$"ϕ	5	30'-10"	Straight
X	$\frac{1}{2}$"ϕ	14	2 at 29'-9" 12 at 29'-3"	Straight
Y	$\frac{1}{2}$"ϕ	28	8 at 19'-4½" 20 at 17'-3"	Straight

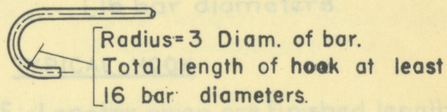
Bars	Size	No.	Description
F	$\frac{7}{8}$"ϕ	16	Bar F 4'-10"
G	$\frac{7}{8}$"ϕ	16	Bar G 8'-10"
H	1"ϕ	44	Bar H 5'-2"
J	1"ϕ	43	Bar J 9'-10"
K	$\frac{1}{2}$"ϕ	50	Bar K 4'-0"
R	1"ϕ	16	Bar R 2 Each at 6'-1¾" to 7'-8⅛" Variance 2⅝"
S	$\frac{7}{8}$"ϕ	16	Bar S 2 Each at 6'-1¾" to 7'-8⅛" Variance 2⅝"
T	1"□	20	Bar T 2 Each at 7'-10¾" to 9'-10⅜" Variance 2⅝"
U	1"ϕ	20	Bar U 2 Each at 7'-10¾" to 9'-10⅜" Variance 2⅝"
V	1"□	30	Bars V 9'-11"
W	1"ϕ	30	Bars W 9'-11"
Z	$\frac{1}{2}$"ϕ	14	Bars Z 1'-4"

Bars	Size	No.	Description
Q	$\frac{5}{8}$"ϕ	30	Bars-Q 4'-10"; Bars-QA 3'-11½"; 4'-1"; 3'-3"; 2'-0½"; 1'-7½"; Bars-Q; Bars-QA
QA	$\frac{5}{8}$"ϕ	30	
NA	$\frac{1}{2}$"ϕ	20	Bars NA 2 at 10'-10"; 2 at 13'-4"; 2 at 15'-10"; 14 at 18'-3½"; 7"; 10"
OA	$\frac{1}{2}$"ϕ	6	Bars OA 2 at 2'-9"; 2 at 5'-1"; 2 at 7'-5"
M	$\frac{1}{2}$"ϕ	10	10"; 7"; 10"; Bar M 26'-9"
PA	$\frac{1}{2}$"ϕ	4	Bar PA 30'-0"



DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINT

Total approximate weight Reinforcing Steel = 11,500 lbs.
Do. Structural Steel = 500 lbs.



TYPICAL HOOK

NOTE:- Lengths given are finished lengths. Shop to make proper allowance for bends.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BENDING DIAGRAM

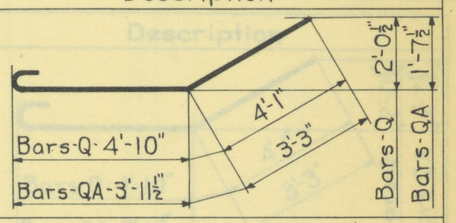
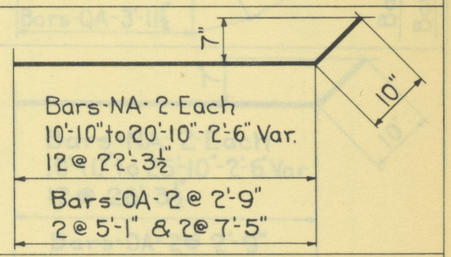
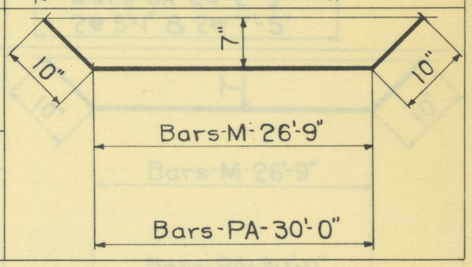
REINFORCED CONCRETE ABUTMENT-DWG. B-6501
19'-REINFORCED CONCRETE DECK-HEIGHT-14'

DESIGNED H.D.J. DRAWN L.T.S.
CHECKED N.W.W. TRACED K.E.G. C.C.J.
RECOMMENDED FOR APPROVAL C.E.M. DATE April 1935.
APPROVED J.E. Bond REGIONAL ENGINEER

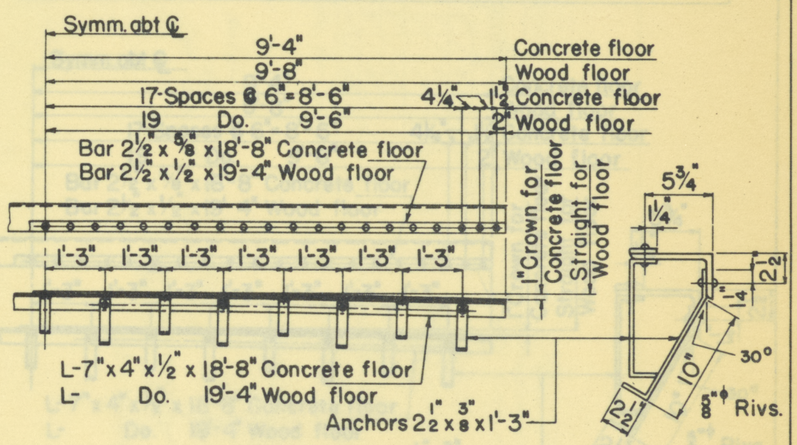
Revised 2-11-36 A.H.B.

187

Bars	Size	No.	Length	Description
A	7/8" ϕ	20	2-Each @ 8'-5½" to 12'-7" - 5½" Variance	Straight
B	1" □	22	2-Each @ 13'-0½" to 17'-7½" - 5½" Variance	Straight
C	1" □	26	13'-7"	Straight
D	½" ϕ	34	2-Each @ 8'-3½" to 17'-7½" - 7" Variance	Straight
E	½" ϕ	24	13'-7"	Straight
L	½" ϕ	11	29'-10"	Straight
N	½" ϕ	22	10-Bars-2-Each-10'-5½" to 20'-5½"-2'-6" Variance 12 @ 23'-0"	Straight
O	½" ϕ	6	2 @ 3'-2" 2 @ 5'-6" 2 @ 7'-10"	Straight
P	½" ϕ	5	30'-10"	Straight
X	½" ϕ	14	2 @ 30'-8" 12 @ 29'-3"	Straight
Y	½" ϕ	28	8 @ 23'-7" 20 @ 21'-3"	Straight

Bars	Size	No.	Description
Q	5/8" ϕ	30	
QA	5/8" ϕ	30	
NA	½" ϕ	22	
OA	½" ϕ	6	
M	½" ϕ	11	
PA	½" ϕ	4	

Bars	Size	No.	Description
F	7/8" ϕ	20	Bars-F-4'-10"
G	7/8" ϕ	20	Bars-G-9'-10"
H	1" □	48	Bars-H-5'-5"
J	1" □	47	Bars-J-10'-7"
K	½" ϕ	58	Bars-K-4'-0"
R	1" ϕ	20	Bars-R-2-Each-6'-2½" to 8'-3¼" - 2¾" Variance
S	1" ϕ	20	Bars-S-2-Each-6'-2½" to 8'-3¼" - 2¾" Variance
T	1" □	24	Bars-T-2-Each-8'-6" to 11'-0¼" - 2¾" Variance
U	1" □	24	Bars-U-2-Each-8'-6" to 11'-0¼" - 2¾" Variance
V	1" □	30	Bars-V-11'-2"
W	1" □	30	Bars-W-11'-2"
Z	½" ϕ	14	Bars-Z-1'-4"



DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINT

Total approximate weight Reinforcing Steel = 15,500 lbs.
Do. Structural Steel = 500 lbs.

TYPICAL HOOK

NOTE:- Lengths given are finished lengths. Shop to make proper allowance for bends.

Revised 2-11-36 A.H.B.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

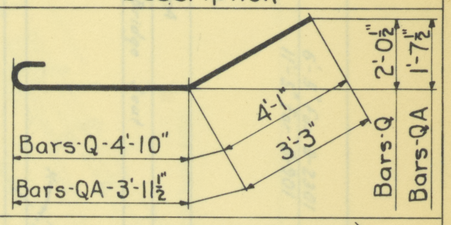
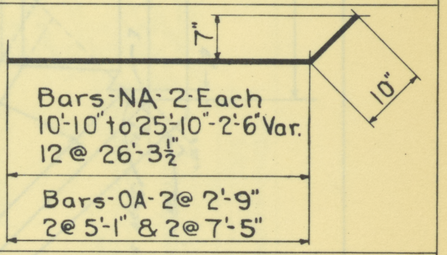
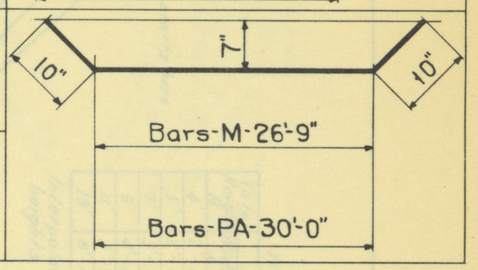
BENDING DIAGRAM

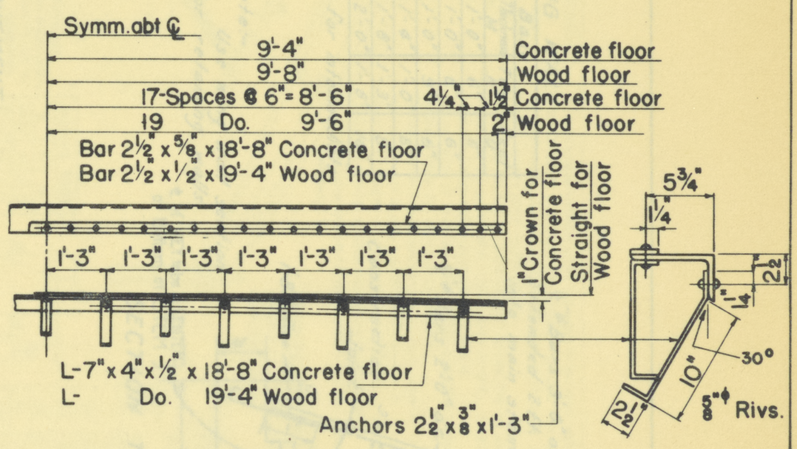
REINFORCED CONCRETE ABUTMENT-DWG. B-6501

19'-REINFORCED CONCRETE DECK-HEIGHT-16'

DESIGNED H.D.J. DRAWN L.T.S.
CHECKED N.W.W. TRACED L.T.S. C.C.J.
RECOMMENDED FOR APPROVAL E.G.M. DATE April 1935
APPROVED REGIONAL ENGINEER

Bars	Size	No.	Length	Description
A	$\frac{7}{8}$"φ	24	2-Each-8'-5½" to 13'-4⅝"-5⅜" Variance	Straight
B	1"□	26	2-Each-13'-10" to 19'-2½"-5⅜" Variance	Straight
C	1"□	26	15'-4"	Straight
D	½"φ	40	2-Each-8'-5" to 19'-3⅝"-6⅞" Variance	Straight
E	½"φ	24	15'-4"	Straight
L	½"φ	13	29'-10"	Straight
N	½"φ	26	14 Bars-2-Each-10'-5½" to 25'-5½"-2'-6" Var. 12 Bars @ 27'-0"	Straight
O	½"φ	6	2@ 3'-2" 2@ 5'-6" 2@ 7'-10"	Straight
P	½"φ	5	30'-10"	Straight
X	½"φ	14	2@ 31'-1" 12@ 29'-3"	Straight
Y	½"φ	28	8@ 27'-10" 20@ 25'-3"	Straight

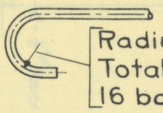
Bars	Size	No.	Description
Q	$\frac{5}{8}$"φ	30	
QA	$\frac{5}{8}$"φ	30	
NA	½"φ	26	
OA	½"φ	6	
M	½"φ	13	
PA	½"φ	4	



Bars	Size	No.	Description
F	$\frac{7}{8}$"φ	24	Bars-F-4'-10"
G	$\frac{7}{8}$"φ	24	Bars-G-10'-4"
H	1"□	52	Bars-H-5'-8"
J	1"□	51	Bars-J-11'-1"
K	½"φ	64	Bars-K-4'-0"
R	1"□	24	Bars-R-2-Each-6'-2" to 8'-9⅝"-2⅞" Variance
S	1"□	24	Bars-S-2-Each-6'-2" to 8'-9⅝"-2⅞" Variance
T	1⅛"□	28	Bars-T-2-Each-9'-0½" to 12'-1⅞"-2⅞" Variance
U	1"□	28	Bars-U-2-Each-9'-0½" to 12'-1⅞"-2⅞" Variance
V	1⅛"□	30	Bars-V-12'-2"
W	1"□	30	Bars-W-12'-2"
Z	½"φ	14	Bars-Z-1'-4"

DETAIL OF STEEL IN ABUTMENT FOR END FLOOR JOINT

Total approximate weight Reinforcing Steel = 18,700 lbs.
Do. Structural Steel = 500 lbs.



Radius = 3 × Diam. of bar.
Total length of hook at least 16 bar diameters

TYPICAL HOOK

NOTE:-Lengths given are finished lengths. Shop to make proper allowance for bends.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BENDING DIAGRAM

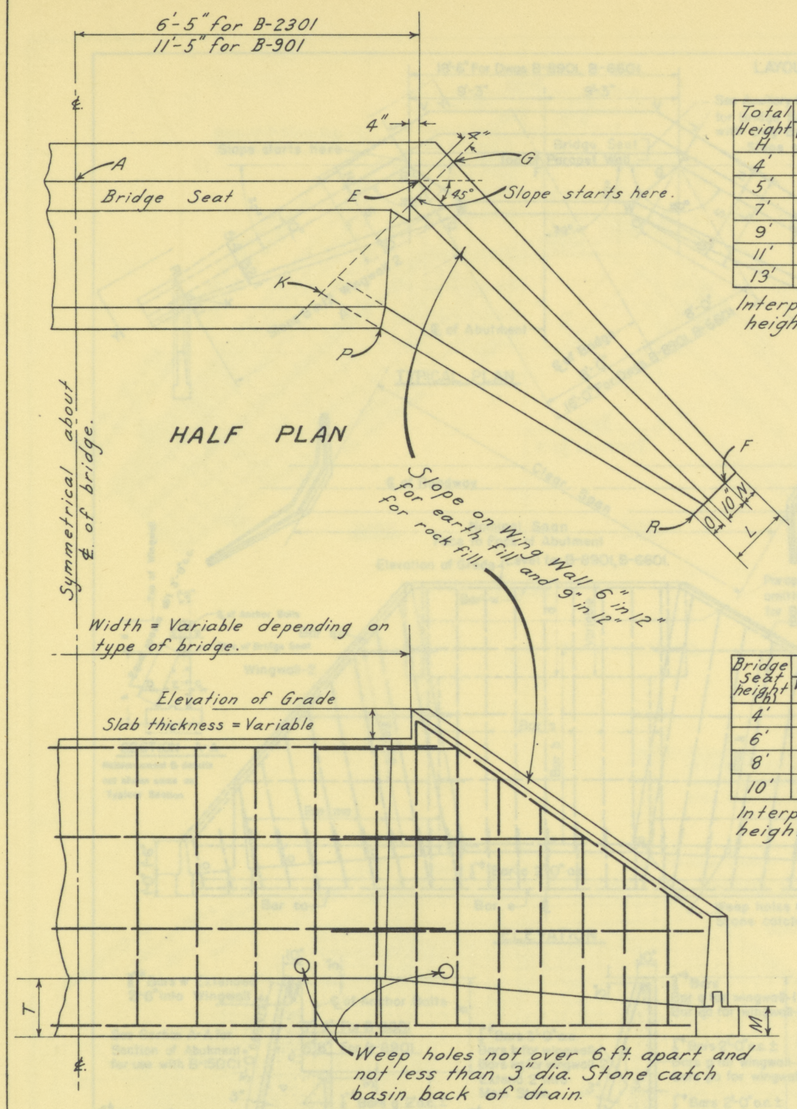
REINFORCED CONCRETE ABUTMENT-DWG. B-6501

19'-REINFORCED CONCRETE DECK-HEIGHT-18'

DESIGNED H.D.J. DRAWN L.T.S.
CHECKED N.W.W. TRACED L.T.S. C.E.J.
RECOMMENDED FOR APPROVAL E.G.M. DATE April, 1935
APPROVED J.A.Doyle REGIONAL ENGINEER

Revised 2-11-36 A.H.B.

189



HALF PLAN

HALF ELEVATION

WING WALL

Total Height H	Base Width L	Thickness M	Toe N	Heel O
4'	2'-0"	1'-0"	6"	6"
5'	2'-6"	1'-0"	6"	6"
7'	3'-6"	1'-0"	9"	6"
9'	4'-8"	1'-4"	1'-0"	6"
11'	5'-9"	1'-8"	1'-3"	8"
13'	6'-10"	2'-0"	1'-6"	10"

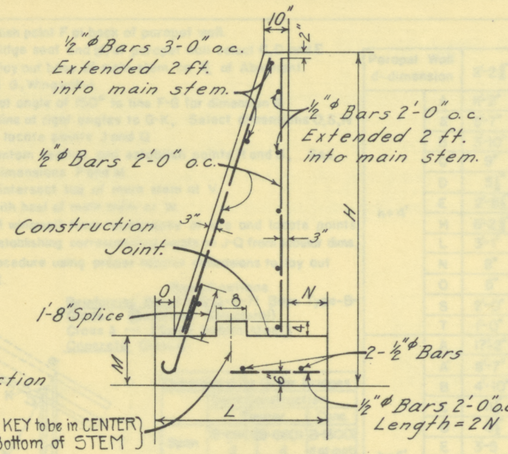
Interpolate for intermediate heights.

Note:- Use wing wall section for retaining walls.

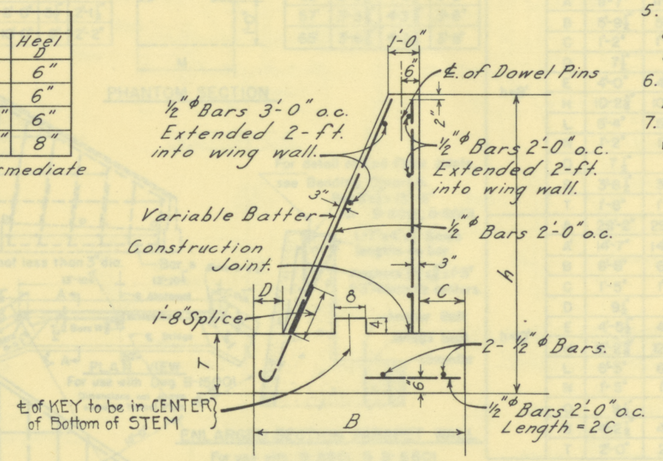
ABUTMENT

Bridge Seat height (h)	Base Width B	Thickness T	Toe C	Heel D
4'	3'-3"	1'-0"	6"	6"
6'	4'-3"	1'-0"	9"	6"
8'	5'-3"	1'-4"	1'-0"	6"
10'	6'-2"	1'-8"	1'-3"	8"

Interpolate for intermediate heights.



SECTION THRU WING WALL



SECTION THRU ABUTMENT

Specifications

1- Reinforcing Bars F.S.Q.Q-B-71. Bars - Type B Grade I (Deformed - Structural) Class (a) (Open Hearth Steel)
2- Concrete Class C
Chamfer exposed edges of Wingwall 1"

Design Data

Slab Thickness for Different Spans	
Span	Thickness
10'	0'-11"
15'	1'-2"
20'	1'-5"
25'	1'-8"

1- Abutment - Horizontal surcharge of 300# per square foot.
2- Wing Wall - Sloping surcharge 1½:1
3- This abutment is suitable for foundation of well compacted clay or gravel if below point subject to scouring.

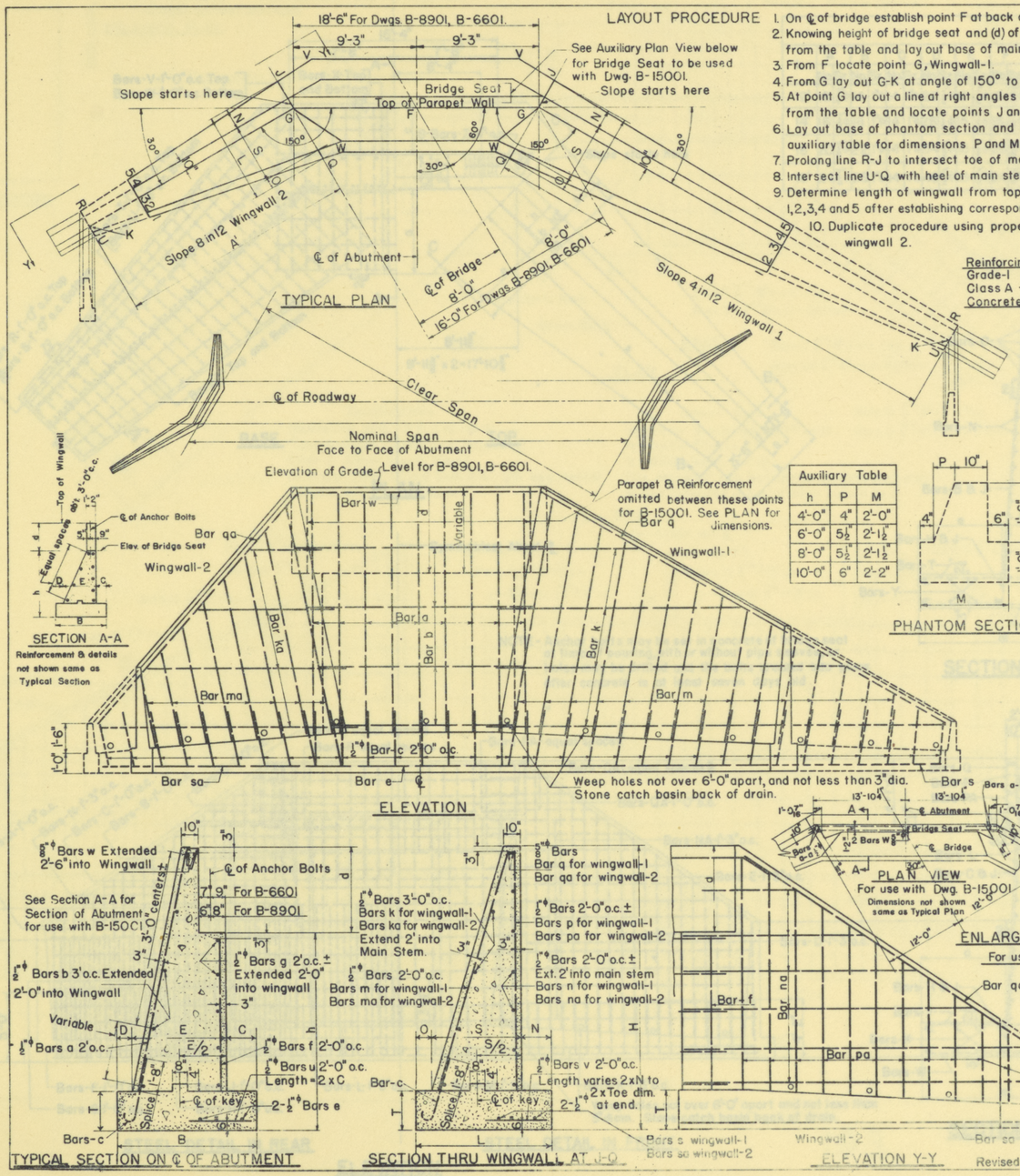
Notes:-

1. On center line of bridge establish point for face of bridge seat "A"
2. Knowing height of bridge seat (h), layout base of main stem and locate point "E"
3. Lay off line "EF" at angle of 45° and "GK" at right angles to "EF"
4. Measure "GK" equal to the base width for wing wall of height "H=h+d"
5. Determine length of wing wall from desired end height and slope of top of wall and establish point "F"
6. Lay off base of end wall according to table of dimensions given for wing walls.
7. Extend "RK" to "P" at intersection with base of main stem

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
GRAVITY ABUTMENT
FOR CONCRETE SLAB

DESIGNED & CHECKED R.E.P. & D.R.
DRAWN M.E.G. TRACED M.E.G.
APPROVED _____ DATE Feb. 1933
Reg. Eng.
Rev. for Construction Key 12-14-34 H.D.J.

Revised Feb. 3-1936. A.H.B.



LAYOUT PROCEDURE

1. On ℄ of bridge establish point F at back of parapet wall.
2. Knowing height of bridge seat and (d) of parapet wall select C, D and E from the table and lay out base of main stem on ℄ of Abutment.
3. From F locate point G, Wingwall-1.
4. From G lay out G-K at angle of 150° to line F-G for dimension A
5. At point G lay out a line at right angles to G-K, Select dimensions O, S, N from the table and locate points J and Q.
6. Lay out base of phantom section and establish points R and U, See auxiliary table for dimensions P and M.
7. Prolong line R-J to intersect toe of main stem at V.
8. Intersect line U-Q with heel of main stem at W.
9. Determine length of wingwall from topography at site and locate points 1,2,3,4 and 5 after establishing corresponding points on J-Q from tabular dims.
10. Duplicate procedure using proper tabular dimensions to lay out wingwall 2.

Specifications.

Reinforcing Bars F.S.Q.Q-B-71 Bars Type-B-Grade-I (Deformed Structural) Class A — (Open hearth steel.)

Concrete Class C

Auxiliary Table		
h	P	M
4'-0"	4"	2'-0"
6'-0"	5½"	2'-1½"
8'-0"	5½"	2'-1½"
10'-0"	6"	2'-2"

Dimension d for Girder Bridges			
	Deck Construction		
	Timber		Conc.
Span	B-8901 d	B-6601 d	B-15001 d at curb
17'	2'-2⅝"		
21'	2'-4½"		
25'	2'-6⅞"	3'-0½"	2'-5"
28'	2'-6⅞"		
33'	2'-9⅜"	3'-6⅜"	2'-11"
41'	3'-0⅞"	3'-9⅝"	3'-2"
49'	3'-0⅞"	4'-0½"	3'-5"
57'	3'-3⅜"	4'-3⅝"	3'-8"
65'	3'-6⅞"	4'-3⅜"	3'-8"

Parapet Wall d-dimension		2'-2⅝"	2'-4½"	2'-5" 2'-6⅜"	2'-9⅜"	2'-11" 3'-0⅜"	3'-2" 3'-3⅜"	3'-5" 3'-6⅜"	3'-8" 3'-9⅜"	4'-0½"	4'-3⅜"
h = 4'	A	11'-2"	11'-7½"	12'-1½"	12'-10"	13'-7½"	14'-4"	15'-1"	15'-10"	16'-7½"	17'-4½"
	A'	5'-7"	5'-9¾"	6'-0¾"	6'-5"	6'-9¾"	7'-2"	7'-6½"	7'-11"	8'-3¾"	8'-8¼"
	B	3'-10"	3'-11"	4'-0"	4'-1½"	4'-3"	4'-4½"	4'-6"	4'-7½"	4'-9"	4'-10½"
	C	8"	8½"	8½"	8½"	9"	9"	9½"	10"	10"	10½"
	D	5½"	5½"	5½"	6"	6"	6"	6½"	6½"	6½"	7"
	E	2'-8½"	2'-9"	2'-10"	2'-11"	3'-0"	3'-1½"	3'-2"	3'-3"	3'-4½"	3'-5"
	H	6'-2⅝"	6'-4½"	6'-6½"	6'-9⅜"	7'-0½"	7'-3⅜"	7'-6⅜"	7'-9⅜"	8'-0½"	8'-3½"
	L	3'-1"	3'-2"	3'-3"	3'-5"	3'-6"	3'-7½"	3'-9½"	3'-11"	4'-1"	4'-3"
	N	8"	8"	8½"	9"	9"	9½"	10"	10"	10½"	11"
	O	5"	5½"	5½"	6"	6"	6"	6½"	6½"	7"	7½"
	S	2'-0"	2'-0½"	2'-1"	2'-2"	2'-3"	2'-4"	2'-5"	2'-6½"	2'-7½"	2'-8½"
	T	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
h = 6'	A	17'-2"	17'-7½"	18'-1½"	18'-10"	19'-7½"	20'-4"	21'-1"	21'-10"	22'-7½"	23'-4½"
	A'	8'-7"	8'-9¾"	9'-0¾"	9'-5"	9'-9¾"	10'-2"	10'-6½"	10'-11"	11'-3¾"	11'-8¼"
	B	4'-10"	4'-11"	5'-0"	5'-1½"	5'-3"	5'-4½"	5'-5½"	5'-7"	5'-8½"	5'-10"
	C	11½"	11½"	11½"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0½"	1'-1"	1'-1½"
	D	5½"	5½"	5½"	5½"	6"	6½"	6½"	6½"	6½"	6½"
	E	3'-5	3'-6"	3'-7	3'-8"	3'-9"	3'-10"	3'-11"	4'-0"	4'-1"	4'-2"
	H	8'-2⅝"	8'-4½"	8'-6½"	8'-9⅜"	9'-0½"	9'-3⅜"	9'-6⅜"	9'-9⅜"	10'-0½"	10'-3½"
	L	4'-2½"	4'-3½"	4'-4½"	4'-6½"	4'-8"	4'-9½"	4'-11"	5'-1"	5'-2½"	5'-4"
	N	10½"	11"	11"	11½"	1'-0"	1'-0½"	1'-0½"	1'-1"	1'-1"	1'-1½"
	O	5½"	5½"	5½"	6"	6"	6"	6½"	6½"	7"	7"
	S	2'-10½"	2'-11"	3'-0"	3'-1"	3'-2"	3'-3"	3'-4"	3'-5½"	3'-6½"	3'-7½"
	T	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"
h = 8'	A	23'-2"	23'-7½"	24'-1½"	24'-10"	25'-7½"	26'-4"	27'-1"	27'-10"	28'-7½"	29'-4½"
	A'	11'-7"	11'-9¾"	12'-0¾"	12'-5"	12'-9¾"	13'-2"	13'-6½"	13'-11"	14'-3¾"	14'-8¼"
	B	5'-9½"	5'-10½"	5'-11"	6'-0½"	6'-2"	6'-3½"	6'-4½"	6'-6"	6'-7½"	6'-9"
	C	1'-2"	1'-2	1'-2	1'-2	1'-3"	1'-3	1'-3	1'-3	1'-4"	1'-4"
	D	7½"	7½"	7½"	8"	8"	8"	8"	8½"	9"	9"
	E	4'-0"	4'-1"	4'-1½"	4'-2½"	4'-3"	4'-4½"	4'-5½"	4'-6½"	4'-6½"	4'-8"
	H	10-2⅝"	10'-4½"	10'-6½"	10'-9⅜"	11'-0½"	11'-3⅜"	11'-6⅜"	11'-9⅜"	12'-0½"	12'-3½"
	L	5'-4"	5'-5"	5'-6"	5'-7½"	5'-9"	5'-10½"	6'-0"	6'-2"	6'-3½"	6'-5"
	N	1'-2"	1'-2½"	1'-2½"	1'-2½"	1'-3"	1'-3	1'-4"	1'-4½"	1'-4½"	1'-5"
	O	7½"	7½"	7½"	8"	8"	8"	8"	8½"	9"	9"
	S	3'-6½"	3'-7"	3'-8"	3'-9	3'-10"	3'-11½"	4'-0"	4'-1"	4'-2"	4'-3"
	T	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"
h = 10'	A	29'-2"	29'-7½"	30'-1½"	30'-10"	31'-7½"	32'-4"	33'-1"	33'-10"	34'-7½"	35'-4½"
	A'	14'-7"	14'-9¾"	15'-0¾"	15'-5"	15'-9¾"	16'-2"	16'-6½"	16'-11"	17'-3¾"	17'-8¼"
	B	6'-8"	6'-8½"	6'-9½"	6'-11"	7'-0"	7'-1½"	7'-2½"	7'-4"	7'-5"	7'-6½"
	C	1'-5"	1'-5"	1'-5½"	1'-6"	1'-6"	1'-6½"	1'-6½"	1'-7"	1'-7"	1'-7½"
	D	9½"	9½"	9½"	10"	10"	10"	10½"	10½"	11"	11"
	E	4'-5½"	4'-6"	4'-6½"	4'-7"	4'-8"	4'-9"	4'-10"	4'-10½"	4'-11½"	5'-0"
	H	12'-2⅝"	12'-4½"	12'-6½"	12'-9⅜"	13'-0½"	13'-3⅜"	13'-6⅜"	13'-9⅜"	14'-0½"	14'-3½"
	L	6'-5"	6'-6"	6'-7"	6'-8½"	6'-10"	6'-11½"	7'-1"	7'-2½"	7'-4½"	7'-6"
	N	1'-5"	1'-5½"	1'-5½"	1'-5½"	1'-6"	1'-6½"	1'-6½"	1'-7"	1'-7½"	1'-8"
	O	9½"	9½"	9½"	10"	10"	10"	10½"	10½"	11"	11"
	S	4'-2½"	4'-3"	4'-4"	4'-5"	4'-6"	4'-7"	4'-8"	4'-9"	4'-10"	4'-11"
	T	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"

Masonry surfaces under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.

Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

Chamfer all exposed edges 1".

Design Data

Abutment- Horizontal Surcharge of 300 lbs. per sq. ft.
Wingwall- Sloping Surcharge ½ to 1.
This abutment is suitable for foundation of well compacted clay or gravel.

Bending Diagrams	
h	Drawing No.
4'	B-8507-D
6'	B-8508-D
8'	B-8509-D
10'	B-8510-D

Not made

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

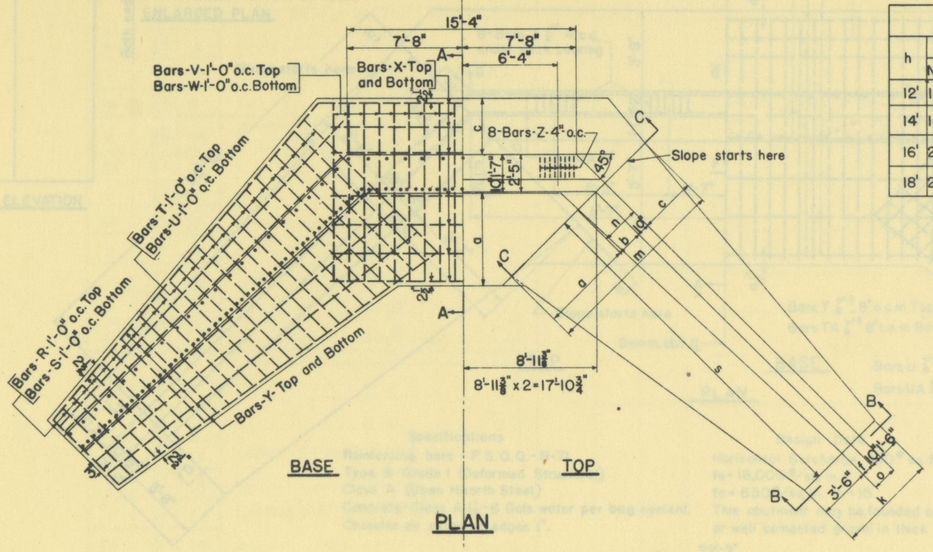
CONCRETE GRAVITY ABUTMENT
WITH PARAPET WALL
FOR DWGS. B-8901, B-6601, AND B-15001
MODIFICATION OF DWG. B-8401

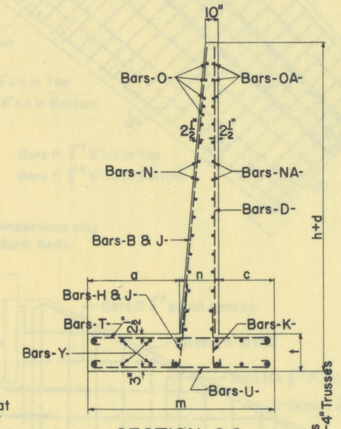
DESIGNED MODIFICATION OF DWG. B-8401.
CHECKED A.H.B.
RECOMMENDED FOR APPROVAL E.E.M.
DRAWN E.C.M.
TRACED A.H.B.
DATE JANUARY 1936
APPROVED [illegible] REGIONAL ENGINEER

R-7-DRAWING Nº B-8701

NO. AND SIZE OF BARS REQUIRED

h	A		B		C		D		E		F		G		H		J		K		L		M		N		NA		O		OA		P		PA		Q		QA		R		S		T		U		V		W		X		Y		Z	
	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.	No.	Sz.
12'	12	¾"	14	I"	14	I"	20	½"	15	½"	12	¾"	12	¾"	28	I"	27	I"	35	½"	8	½"	8	½"	16	½"	16	½"	8	½"	8	½"	5	½"	4	½"	18	⅝"	18	⅝"	12	⅝"	12	¾"	18	I"	18	⅝"	18	I"	18	⅝"	14	½"	28	½"	16	½"
14'	16	⅞"	18	I"	14	I"	26	½"	15	½"	16	⅞"	16	⅞"	32	I"	31	I"	41	½"	10	½"	10	½"	20	½"	20	½"	8	½"	8	½"	5	½"	4	½"	18	⅝"	18	⅝"	16	I"	16	⅞"	22	I"	22	I"	18	I"	18	I"	14	½"	28	½"	16	½"
16'	20	⅞"	22	I"	14	I"	34	½"	15	½"	20	⅞"	20	⅞"	36	I"	35	I"	49	½"	11	½"	11	½"	22	½"	22	½"	8	½"	8	½"	5	½"	4	½"	18	⅝"	18	⅝"	20	I"	20	I"	26	I"	26	I"	18	I"	18	I"	14	½"	28	½"	16	½"
18'	24	⅞"	26	I"	14	I"	40	½"	15	½"	24	⅞"	24	⅞"	40	I"	39	I"	55	½"	13	½"	13	½"	26	½"	26	½"	8	½"	8	½"	5	½"	4	½"	18	⅝"	18	⅝"	24	I"	24	I"	30	I"	30	I"	18	I"	18	I"	14	½"	28	½"	16	½"





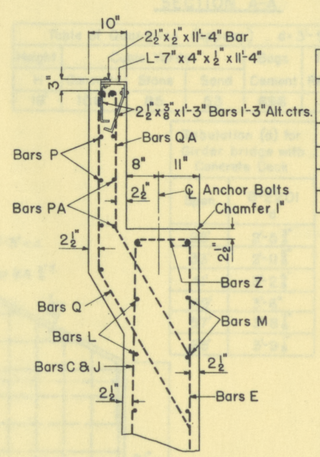


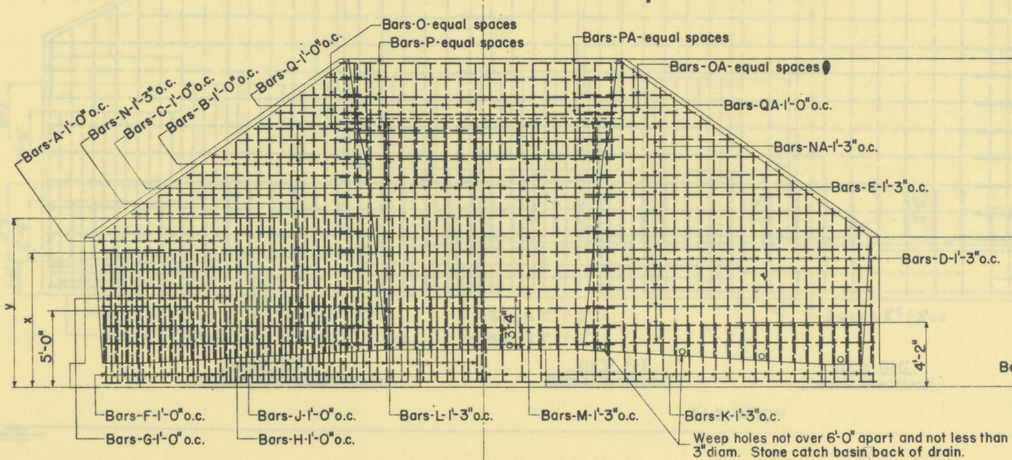
TABLE OF DIMENSIONS

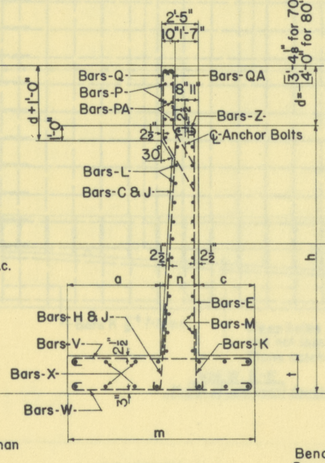
h	a	b	c	n	m	f	o	k	s	t	x	y
12'	5'-6"	1'-0"	2'-2"	1'-10"	9'-6"	7½"	1'-5½"	6'-5⅝"	12'-0"	2'-0"	7'-0"	9'-6"
14'	5'-9"	1'-2"	2'-6"	2'-0"	10'-3"	7¾"	1'-5¾"	6'-5¾"	16'-0"	2'-0"	7'-6"	10'-0"
16'	6'-0"	1'-5"	3'-3"	2'-3"	11'-6"	8½"	1'-6½"	6'-6½"	20'-0"	2'-3"	8'-0"	10'-9"
18'	6'-3"	1'-8"	3'-9"	2'-6"	12'-6"	9"	1'-7"	6'-7"	24'-0"	2'-6"	8'-6"	11'-3"

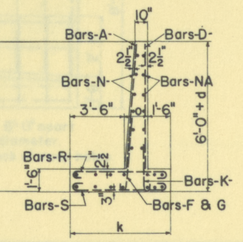
QUANTITIES

Height h	Cubic Yards. Concrete	Sand	Stone	Bags of Cement	Reinforcing Steel
12'	50	25	40	328	6,500 lbs.
14'	65	33	52	427	9,000 lbs.
16'	87	44	70	571	12,400 lbs.
18'	112	56	90	735	15,700 lbs.

NOTE - Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.







Bending Diagrams
Dwg. No. B-8702-D
Dwg. No. B-8703-D
Dwg. No. B-8704-D
Dwg. No. B-8705-D

SPECIFICATIONS

Reinforcing Bars-F.S.QQ-B-71. Type B-Grade I (Deformed Structural) Class-A- (Open Hearth Steel)
Concrete-Class A-1½
Chamfer all exposed edges 1".
Masonry surface under bearing plates to be finished true and level at time of pouring, supplemented by rubbing with carborundum block if necessary.

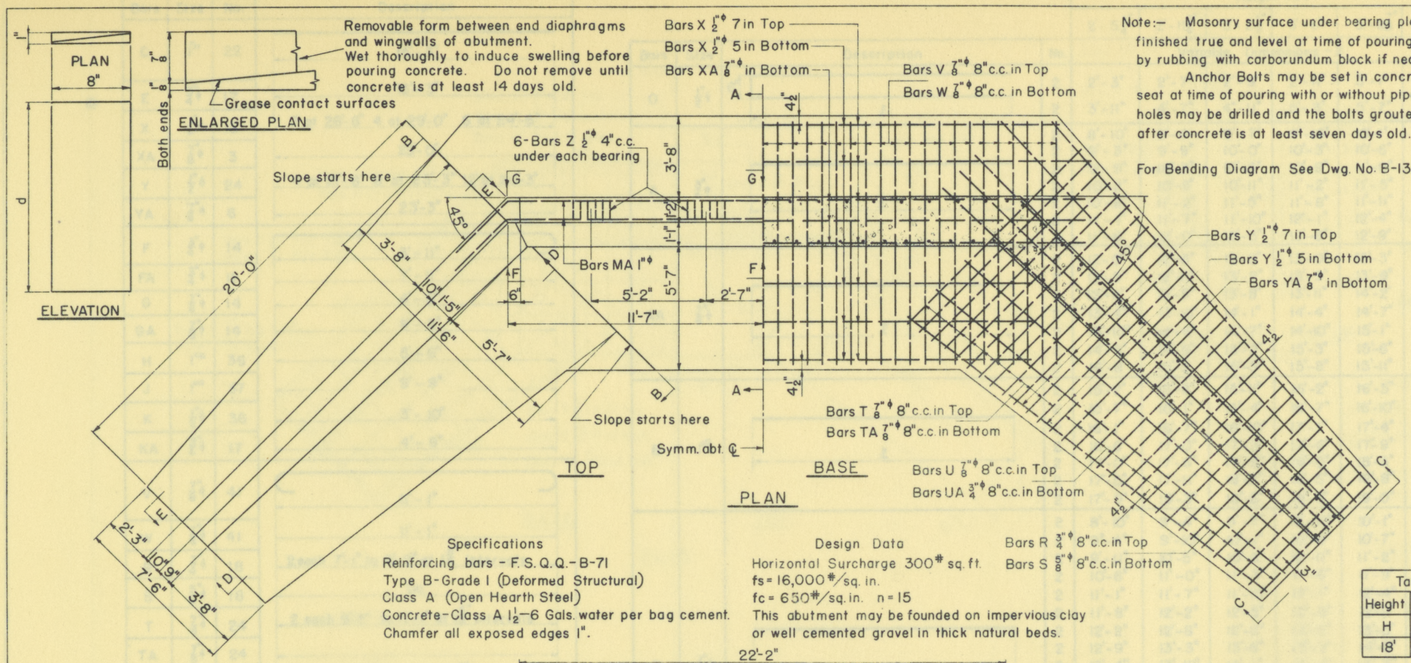
DESIGN DATA

Horizontal Surcharge 300#/sq. ft.
f_s = 16000#/sq. in.
f_c = 650#/sq. in. — n = 15
This abutment is suitable for foundation of well compacted clay or gravel.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REINFORCED CONCRETE ABUTMENT
FOR TRUSS BRIDGES
DWG. NOS. B-9101, B-11001 & B-11301
11'-ROADWAY --- HEIGHTS 12 FT. TO 18 FT.

DESIGNED H.D.J. DRAWN H.D.J. A.H.B.
CHECKED TRACED L.T.S. A.H.B.
RECOMMENDED FOR APPROVAL DATE JUNE, 1935
APPROVED REGIONAL ENGINEER

(c.c.J) REVISED 2-3-1936 - Notes & Back - REVISED 8-20-1935 wall steel



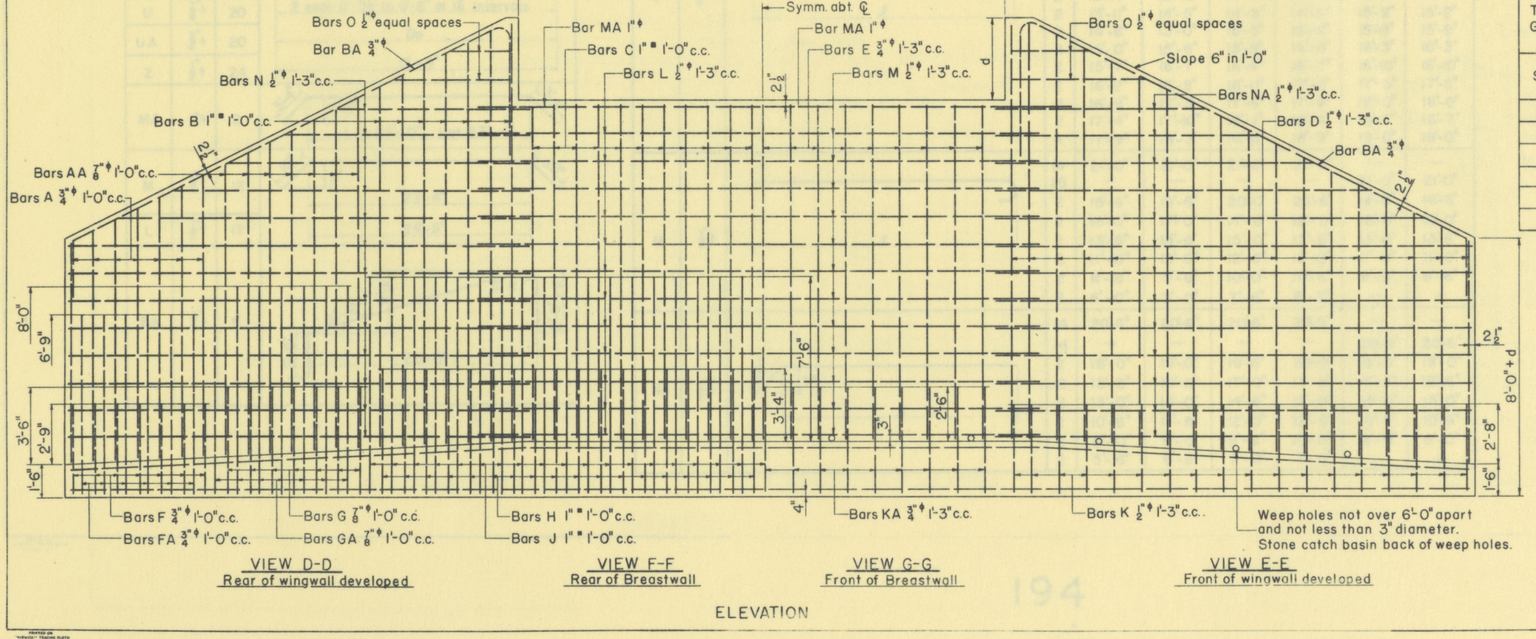
Specifications
Reinforcing bars - F. S. Q. Q. - B-71
Type B-Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete-Class A 1½-6 Gals. water per bag cement.
Chamfer all exposed edges 1".

Design Data
Horizontal Surcharge 300# sq. ft.
fs = 16,000#/sq. in.
fc = 650#/sq. in. n = 15
This abutment may be founded on impervious clay or well cemented gravel in thick natural beds.

Table of Quantities (Approx.) d = 3'-9⅛"					
Height	Cubic Yards			Bags	Pounds
H	Concrete	Stone	Sand	Cement	Reinfg. Stl.
18'	106	85	53	696	13,700

Tabulation (d) for Girder bridge with Concrete Deck

Span	B-2201 d
25'	2'-5¾"
33'	2'-11⅛"
41'	3'-2⅝"
49'	3'-6"
57'	3'-8⅞"
65'	3'-9⅛"



U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

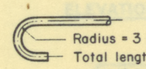
REINFORCED CONCRETE ABUTMENT-WING TYPE
FOR BEAM BRIDGES SHOWN ON DWG. B-2201
HEIGHT-18FT. ROADWAY-19FT.

DESIGNED M.W.W.
CHECKED C.C.
RECOMMENDED FOR APPROVAL E.E.W.
DRAWN A.H.B.
TRACED A.H.B. CC
DATE SEPTEMBER 1935
APPROVED REGIONAL ENGINEER

Bars	Size	No.	Description
C	1" □	22	15'-3"
E	¾" ϕ	17	15'-3"
X	½" ϕ	12	2 at 26'-6" 4 at 29'-0" 6 at 24'-6"
XA	⅝" ϕ	3	29'-0"
Y	½" ϕ	24	4 at 21'-8" 8 at 23'-3" 12 at 20'-3"
YA	⅞" ϕ	6	23'-3"
F	¾" ϕ	14	3'-11"
FA	⅜" ϕ	12	7'-11"
G	⅞" ϕ	14	4'-8"
GA	⅞" ϕ	14	9'-2"
H	1" □	36	5'-6"
J	1" □	37	9'-8"
K	½" ϕ	36	3'-10"
KA	¾" ϕ	17	4'-8"
V	⅞" ϕ	41	11'-1"
W	⅞" ϕ	41	11'-1"
R	¾" ϕ	18	2 each 7'-1" to 8'-2" at 1⅝" Intervals
S	⅝" ϕ	18	Do
T	⅞" ϕ	24	2 each 9'-7" to 11'-1" at 1⅝" Intervals
TA	⅞" ϕ	24	
U	⅞" ϕ	20	2 each 8'-3½" to 9'-6" at 1⅝" Intervals
UA	¾" ϕ	20	Do
Z	½" ϕ	24	0'-9"
MA	1" ϕ	2	3'-4" 2'-4" 3'-4" 1 at 23'-0" 1 at 23'-4"
M	½" ϕ	12	10" 7" 10" 23'-4" 24'-6"
L	½" ϕ	12	
BA	¾" ϕ	4	6" 12" 9'-11" 6" R. 2'-6" 2'-6" 20'-5"

Bars	Size	Description	No.	Height (d) 2'-5¾"	2'-11⅝"	3'-2⅝"	3'-6"	3'-8⅞"	3'-9⅛"
				Variable Dimensions – ℓ					
O	½" ϕ	6"	2	2'-3"	2'-7"	2'-9"	2'-11"	3'-1"	3'-1"
		ℓ	2	3'-11"	4'-7"	4'-11"	5'-3"	5'-7"	5'-7"
A	¾" ϕ	ℓ	2	8'-10"	9'-4	9'-7"	9'-10"	10'-1"	10'-1"
			2	9'-3"	9'-9"	10'-0"	10'-3"	10'-6"	10'-6"
			2	9'-9"	10'-3"	10'-6"	10'-9"	11'-0"	11'-0"
			2	10'-2"	10'-8"	10'-11"	11'-2"	11'-5"	11'-5"
			2	10'-8"	11'-2"	11'-5"	11'-8"	11'-11"	11'-11"
			2	11'-1"	11'-7"	11'-10"	12'-1"	12'-4"	12'-4"
			2	11'-6"	12'-0"	12'-3"	12'-6"	12'-9"	12'-9"
AA	⅞" ϕ	ℓ	2	12'-0"	12'-6"	12'-9"	13'-0"	13'-3"	13'-3"
			2	12'-5"	12'-11"	13'-2"	13'-5"	13'-8"	13'-8"
			2	12'-11"	13'-5"	13'-8"	13'-11"	14'-2"	14'-2"
			2	13'-4"	13'-10"	14'-1"	14'-4"	14'-7"	14'-7"
			2	13'-10"	14'-4"	14'-7"	14'-10"	15'-1"	15'-1"
			2	14'-3"	14'-9"	15'-0"	15'-3"	15'-6"	15'-6"
			2	14'-8	15'-2	15'-5"	15'-8"	15'-11"	15'-11"
B	1" □	ℓ	2	15'-2"	15'-8"	15'-11"	16'-2"	16'-5"	16'-5"
			2	15'-7"	16'-1"	16'-4"	16'-7"	16'-10"	16'-10"
			2	16'-1"	16'-7"	16'-10"	17'-1"	17'-4"	17'-4"
			2	16'-6"	17'-0"	17'-3"	17'-6"	17'-9"	17'-9"
			2	17'-0"	17'-6"	17'-9"	18'-0"	18'-3"	18'-3"
			2	17'-5"	17'-11"	18'-2"	18'-5"	18'-8"	18'-8"
			2	17'-9"	18'-3"	18'-6"	18'-9"	19'-0"	19'-0"
D	½" ϕ	ℓ	2	8'-10"	9'-4"	9'-7"	9'-10"	10'-1"	10'-1"
			2	9"-4"	9'-10"	10'-1"	10'-4"	10'-7"	10'-7"
			2	9'-11"	10'-5"	10'-8"	10'-11"	11'-2"	11'-2"
			2	10'-6"	11'-0"	11'-3"	11'-6"	11'-9"	11'-9"
			2	11'-1"	11'-7"	11'-10"	12'-1"	12'-4"	12'-4"
			2	11'-8"	12'-2"	12'-5"	12'-8"	12'-11"	12'-11"
			2	12'-2"	12'-8"	12'-11"	13'-2"	13'-5"	13'-5"
			2	12'-9"	13'-3"	13'-6"	13'-9"	14'-0"	14'-0"
			2	13'-4"	13'-10"	14'-1"	14'-4"	14'-7"	14'-7"
			2	13'-11"	14'-5"	14'-8"	14'-11"	15'-2"	15'-2"
			2	14'-6"	15'-0"	15'-3"	15'-6"	15'-9"	15'-9"
			2	15'-0"	15'-6"	15'-9"	16'-0"	16'-3"	16'-3"
			2	15'-7"	16'-1"	16'-4"	16'-7"	16'-10"	16'-10"
			2	16'-2"	16'-8"	16'-11"	17'-2"	17'-5"	17'-5"
			2	16'-9"	17'-3"	17'-6"	17'-9"	18'-0"	18'-0"
			2	17'-4"	17'-10"	18'-1"	18'-4"	18'-7"	18'-7"
			4	17'-9"	18'-3"	18'-6"	18'-9"	19'-0"	19'-0"
N	½" ϕ	ℓ	14	21'-0"	21'-0"	21'-0"	21'-0"	—	—
			16	—	—	—	—	21'-0"	21'-0"
			2	18'-6"	19'-6"	20'-0"	20'-6"	18'-6"	18'-6"
			2	16'-0"	17'-0"	17'-6"	18'-0"	16'-0"	16'-0"
			2	13'-6"	14'-6"	15'-0"	15'-6"	13'-6"	13'-6"
			2	11'-0"	12'-0"	12'-6"	13'-0"	11'-0"	11'-0"
			2	8'-6"	9'-6"	10'-0"	10'-6"	8'-6"	8'-6"
			2	6'-0"	7'-0"	7'-6"	8'-0"	—	—
NA	½" ϕ	10" 7" ℓ	14	20'-6"	20'-6"	20'-6"	20'-6"	—	—
			16	—	—	—	—	20'-6"	20'-6"
			2	18'-0"	19'-0"	19'-6"	20'-0"	18'-0"	18'-0"
			2	15'-6"	16'-6"	17'-0"	17'-6"	15'-6"	15'-6"
			2	13'-0"	14'-0"	14'-6"	15'-0"	13'-0"	13'-0"
			2	10'-6"	11'-6"	12'-0"	12'-6"	10'-6"	10'-6"
			2	8'-0"	9'-0"	9'-6"	10'-0"	8'-0"	8'-0"
			2	5'-6"	6'-6"	7'-0"	7'-6"	—	—

Tabulation (d) for Girder bridge with Concrete Deck	
Span	B-2201
25'	2'-5¾"
33'	2'-11⅝"
41'	3'-2⅝"
49'	3'-6"
57'	3'-8⅞"
65'	3'-9⅛"



Radius = 3 diam. of bar
Total length of hook at least 16 bar diameters

TYPICAL HOOK

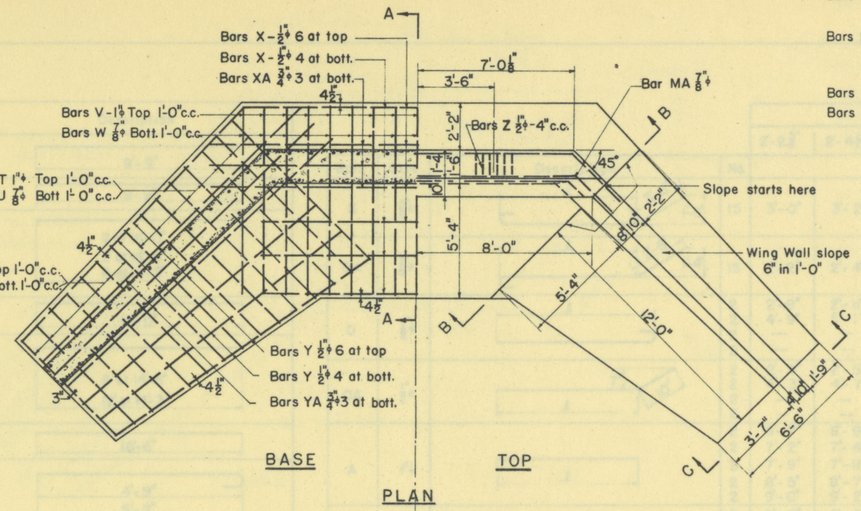
Note Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

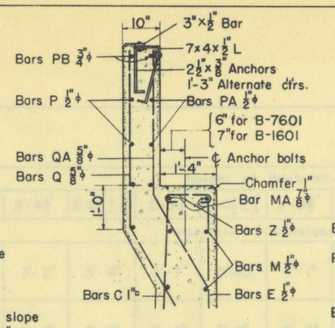
Specifications
Reinforcing bars – F.S.Q.Q. – B-71
Type B - Grade - 1 (Deformed Structural)
Class A (Open Hearth Steel)

Total approximate weight 13700# d=3'-9"

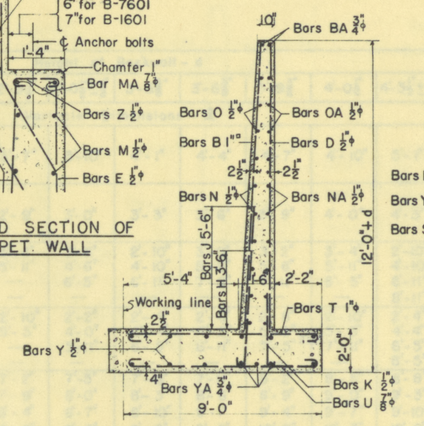
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. B-13707
FOR BEAM BRIDGE DWG. B-2201
HEIGHT 18'-0"

DESIGNED M.W.W. DRAWN A.M.
CHECKED A.M. TRACED A.M.
RECOMMENDED FOR APPROVAL E.E.M. DATE Sept. 1935
APPROVED REGIONAL ENGINEER

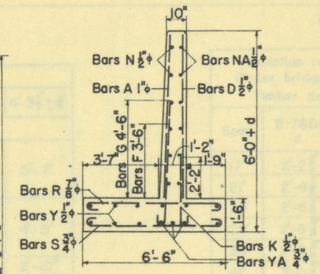




ENLARGED SECTION OF PARAPET WALL



SECTION B-B



ELEVATION C-C

Tabulation (d) for Girder bridge with Timber deck

Span	B-7601 d	B-1601 d
17'	2'-2"	—
21'	2'-4 1/2"	—
25'	2'-6"	3'-0 1/2"
28'	2'-6"	—
33'	2'-9"	3'-6"
41'	3'-0"	3'-9"
49	3'-0"	4'-0 1/2"
57'	3'-3"	4'-3"
65'	3'-6"	4'-3"

Table of Quantities (Approx.) d = 4'-3 5/8"

Height	Cubic Yards			Bags	Lbs
H	Concrete	Stone	Sand	Cement	Reinforcing Steel
12'	45	36	23	295	6,600

Specifications

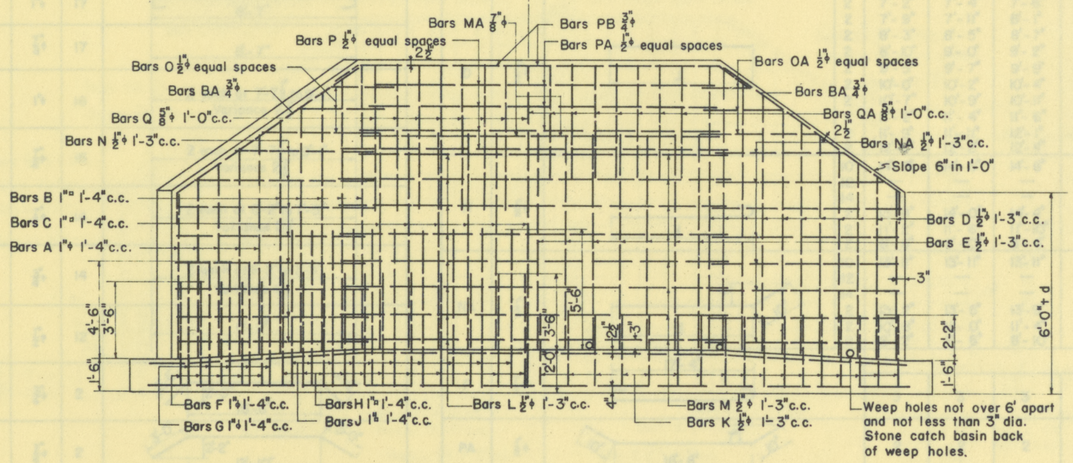
Reinforcing bars - F.S.Q.Q.-B-71
Type B-Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete - Class A 1 1/2-6 Gals water per bag cement.
Chamfer all exposed edges 1".

Design Data

Horizontal Surcharge 300 #/sq. ft.
fs = 16000 #/sq. in.
fc = 650 #/sq. in. - n = 15
This abutment may be founded on impervious clay or well cemented gravel in thick natural beds.

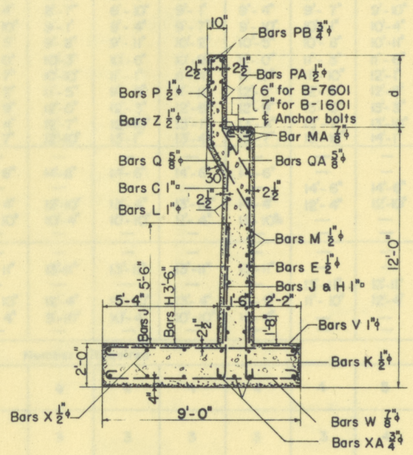
Note :- Masonry surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary. Anchor bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

For Bending Diagram See Dwg. No. B-13605.



STEEL DETAILS IN REAR ELEVATION

STEEL DETAILS IN FRONT ELEVATION



SECTION A-A

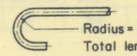
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REINFORCED CONCRETE ABUTMENT-WING TYPE
FOR BEAM BRIDGES - 11 FT ROADWAY
DWG. B-1601 AND B-7601
HEIGHT 12 FT.

DESIGNED W.W.W. DRAWN W.W.W. E.C.J.
CHECKED E.E.D. TRACED A.M.
RECOMMENDED FOR APPROVAL E.E.M. DATE Sept. 1935
APPROVED [signature] REGIONAL ENGINEER

Bars	Size	No.	Description
C	1" □	11	9'-9"
E	½" ϕ	14	9'-9"
X	½" ϕ	10	2 at 16'-0" 2 at 16'-6" 6 at 14'-3"
XA	¾" ϕ	3	19'-0"
Y	½" ϕ	20	8 at 14'-8" 12 at 14'-3"
YA	¾" ϕ	6	16'-6"
F	1" ϕ	10	4'-9"
G	1" ϕ	10	5'-9"
H	1" □	21	5'-3"
J	1" □	20	7'-3"
K	½" ϕ	34	3'-5"
V	1" ϕ	17	8'-7"
W	⅞" ϕ	17	8'-7"
T	1" ϕ	16	2 each at 7'-7½" to 9'-1" Variance 2½"
U	⅞" ϕ	16	2 each at 7'-7½" to 9'-1" Variance 2½"
R	⅞" ϕ	14	2 each at 6'-2" to 7'-5" Variance 2½"
S	¾" ϕ	14	2 each at 6'-2" to 7'-5" Variance 2½"
Z	½" ϕ	12	0'-11"
PB	¾" ϕ	2	2'-6", 2'-0", 2'-6", 16'-6"
MA	⅞" ϕ	2	3'-0", 2'-2", 3'-0", 13'-10"
M	½" ϕ	8	10", 7", 10", 13'-10"
L	½" ϕ	8	10", 7", 10", 15'-8"
BA	¾" ϕ	4	1'-6", 1'-6", 13'-4"

Bars	Size	Description	No.	Height of Backwall – d: 2'-2⅝"	2'-4½"	2'-6½" ± ⅛"	2'-9⅜"	3'-0½" ± ⅛"	3'-3⅜"	3'-6⅜"	3'-9⅜"	4'-0½"	4'-3½" ± ⅛"
				Variable Dimensions – ℓ									
Q	⅝" ϕ	ℓ, 3'-6", 1'-9"	15	3'-0"	3'-2"	3'-4"	3'-7"	3'-10"	4'-1"	4'-4"	4'-7"	4'-10"	5'-1"
QA	⅝" ϕ	ℓ, 2'-8", 1'-4"	15	2'-2"	2'-4"	2'-6"	2'-9"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-3"
O	½" ϕ	ℓ	2	2'-9"	2'-11"	3'-1"	3'-4"	2'-8"	2'-10"	3'-0"	3'-2"	3'-4"	2'-10"
			2	4'-9"	5'-1"	5'-5"	5'-11"	4'-6"	4'-10"	5'-2"	5'-6"	5'-11"	4'-10"
			2	—	—	—	—	6'-5"	6'-11"	7'-5"	7'-11"	8'-5"	6'-11"
			2	—	—	—	—	—	—	—	—	—	8'-11"
OA	½" ϕ	7", 10", ℓ	2	2'-3"	2'-5"	2'-7"	2'-10"	2'-2"	2'-4"	2'-6"	2'-8"	2'-10"	2'-4"
			2	4'-3"	4'-7"	4'-11"	5'-5"	4'-0"	4'-4"	4'-8"	5'-0"	5'-5"	4'-4"
			2	—	—	—	—	5'-11"	6'-5"	6'-11"	7'-5"	7'-11"	6'-5"
			2	—	—	—	—	—	—	—	—	—	8'-5"
A	1" ϕ	ℓ	2	6'-7"	6'-9"	6'-11"	7'-2"	7'-5"	7'-8"	7'-11"	8'-2"	8'-5"	8'-8"
			2	7'-2"	7'-4"	7'-6"	7'-9"	8'-0"	8'-3"	8'-6"	8'-9"	9'-0"	9'-3"
			2	7'-9"	7'-11"	8'-1"	8'-4"	8'-7"	8'-10"	9'-1"	9'-4"	9'-7"	9'-10"
			2	8'-5"	8'-7"	8'-9"	9'-0"	9'-3"	9'-6"	9'-9"	10'-0"	10'-3"	10'-6"
			2	9'-0"	9'-2"	9'-4"	9'-7"	9'-10"	10'-1"	10'-4"	10'-7"	10'-10"	11'-1"
B	1" □	ℓ	2	9'-7"	9'-9"	9'-11"	10'-2"	10'-5"	10'-8"	10'-11"	11'-2"	11'-5"	11'-8"
			2	10'-3"	10'-5"	10'-7"	10'-10"	11'-1"	11'-4"	11'-7"	11'-10"	12'-1"	12'-4"
			2	10'-10"	11'-0"	11'-2"	11'-5"	11'-8"	11'-11"	12'-2"	12'-5"	12'-8"	12'-11"
			2	11'-5"	11'-7"	11'-9"	12'-0"	12'-3"	12'-6"	12'-9"	13'-0"	13'-3"	13'-6"
			2	12'-0"	12'-2"	12'-4"	12'-7"	12'-10"	13'-1"	13'-4"	13'-7"	13'-10"	14'-1"
D	½" ϕ	ℓ	2	6'-7"	6'-9"	6'-11"	7'-2"	7'-5"	7'-8"	7'-11"	8'-2"	8'-5"	8'-8"
			2	7'-2"	7'-4"	7'-6"	7'-9"	8'-0"	8'-3"	8'-6"	8'-9"	9'-0"	9'-3"
			2	7'-9"	7'-11"	8'-1"	8'-4"	8'-7"	8'-10"	9'-1"	9'-4"	9'-7"	9'-10"
			2	8'-3"	8'-5"	8'-7"	8'-10"	9'-1"	9'-4"	9'-7"	9'-10"	10'-1"	10'-4"
			2	8'-10"	9'-0"	9'-2"	9'-5"	9'-8"	9'-11"	10'-2"	10'-5"	10'-8"	10'-11"
			2	9'-5"	9'-7"	9'-9"	10'-0"	10'-3"	10'-6"	10'-9"	11'-0"	11'-3"	11'-6"
			2	10'-0"	10'-2"	10'-4"	10'-7"	10'-10"	11'-1"	11'-4"	11'-7"	11'-10"	12'-1"
			2	10'-7"	10'-9"	10'-11"	11'-2"	11'-5"	11'-8"	11'-11"	12'-2"	12'-5"	12'-8"
			2	11'-2"	11'-4"	11'-6"	11'-9"	12'-0"	12'-3"	12'-6"	12'-9"	13'-0"	13'-3"
			2	11'-9"	11'-11"	12'-1"	12'-4"	12'-7"	12'-10"	13'-1"	13'-4"	13'-7"	13'-10"
			2	12'-0"	12'-2"	12'-4"	12'-7"	12'-10"	13'-1"	13'-4"	13'-7"	13'-10"	14'-1"
N	½" ϕ	ℓ	10	14'-6"	14'-6"	14'-6"	—	—	—	—	—	—	—
			12	—	—	—	14'-6"	14'-6"	14'-6"	14'-6"	14'-6"	—	—
			14	—	—	—	—	—	—	—	—	14'-6"	14'-6"
			2	13'-8"	14'-0"	14'-4"	12'-4"	12'-10"	13'-4"	13'-10"	14'-4"	12'-4"	12'-10"
			2	11'-2"	11'-6"	11'-10"	9'-10"	10'-4"	10'-10"	11'-4"	11'-10"	—	—
			2	8'-8"	9'-0"	9'-4"	—	—	—	—	—	—	—
NA	½" ϕ	7", 10", ℓ	10	13'-11"	13'-11"	13'-11"	—	—	—	—	—	—	—
			12	—	—	—	13'-11"	13'-11"	13'-11"	13'-11"	13'-11"	—	—
			14	—	—	—	—	—	—	—	—	13'-11"	13'-11"
			2	13'-2"	13'-6"	13'-9"	11'-10"	12'-4"	12'-10"	13'-4"	13'-9"	11'-10"	12'-4"
			2	10'-8"	11'-0"	11'-4"	12'-4"	9'-10"	10'-4"	10'-10"	11'-4"	—	—
			2	8'-2"	8'-6"	8'-10"	—	—	—	—	—	—	—
				Number Required									
P	½" ϕ	17'-4"		3	3	3	3	4	4	4	4	4	5
PA	½" ϕ	10", 7", 10", 16'-6"		2	2	2	2	3	3	3	3	3	4

Tabulation (d) for Girder bridges with Timber deck		
Span	B-7601 d	B-1601 d
17'	2'-2⅝"	—
21'	2'-4½"	—
25'	2'-6½" ± ⅛"	3'-0⅛"
28'	2'-6⅜"	—
33'	2'-9⅜"	3'-6⅜"
41'	3'-0⅜"	3'-9⅜"
49'	3'-3⅜"	4'-0½"
57'	3'-3⅜"	4'-3⅜"
65'	3'-6⅜"	4'-3⅜"



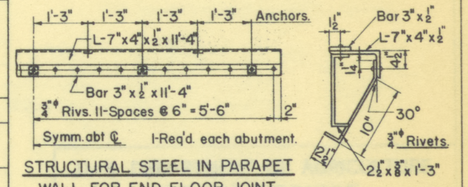
Radius = 3 diam. of bar.
Total lenth of hook at least 16 bar diameters.

TYPICAL HOOK

Note Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

Specifications
Reinforcing bars – F.S.Q.Q.- B-71
Type B-Grade-1 (Deformed Structural)
Class A (Open Hearth Steel)

Total approximate weight 6600. # d=4'-3⅝"



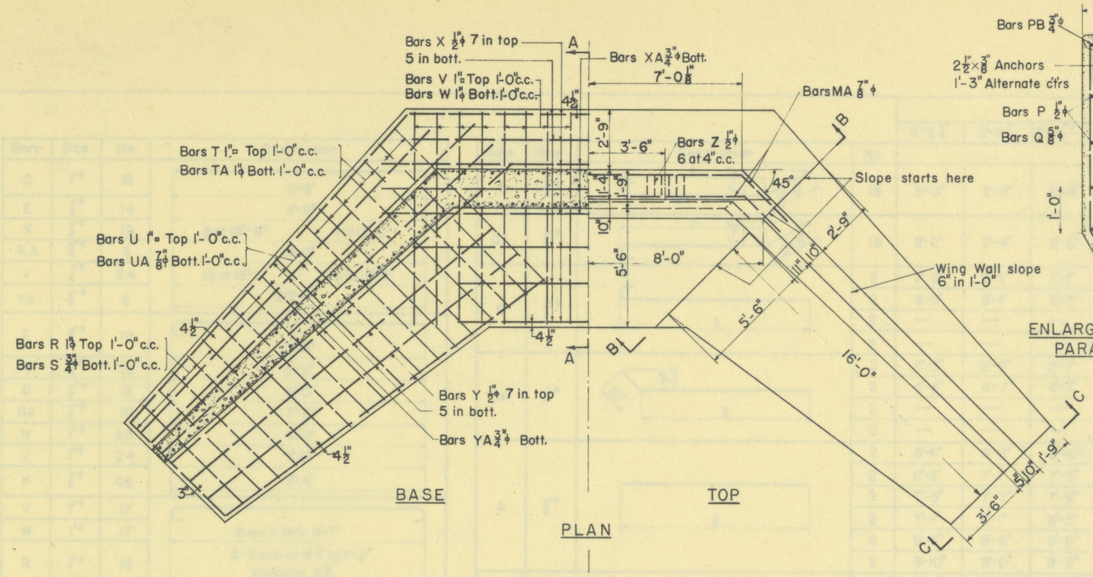
STRUCTURAL STEEL IN PARAPET WALL FOR END FLOOR JOINT

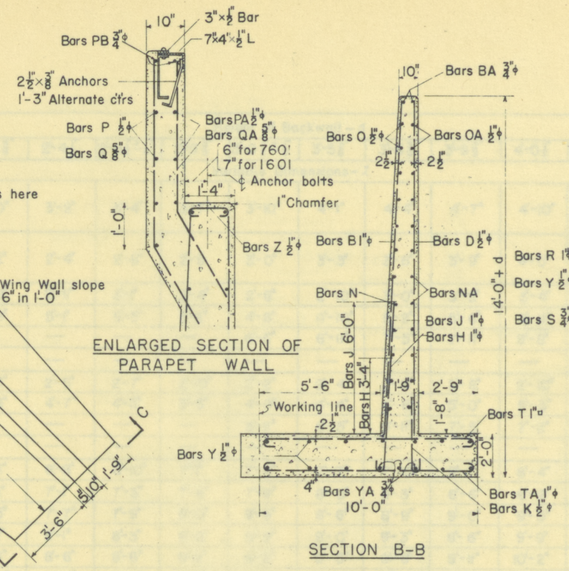
DETAIL OF ANCHORS.

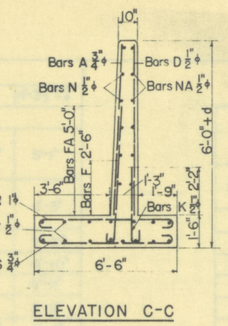
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. B-13601
FOR BEAM BRIDGES DWG. B-1601 AND B-7601
HEIGHT 12'-0"

DESIGNED C.C.J.
CHECKED A.M.W.
RECOMMENDED FOR APPROVAL E.E.W.C.
DRAWN C.C.J. C.C.J.
TRACED A.M.
DATE Sept. 1935
APPROVED J. Gibbons REGIONAL ENGINEER

REVISED DEC. 16-1935

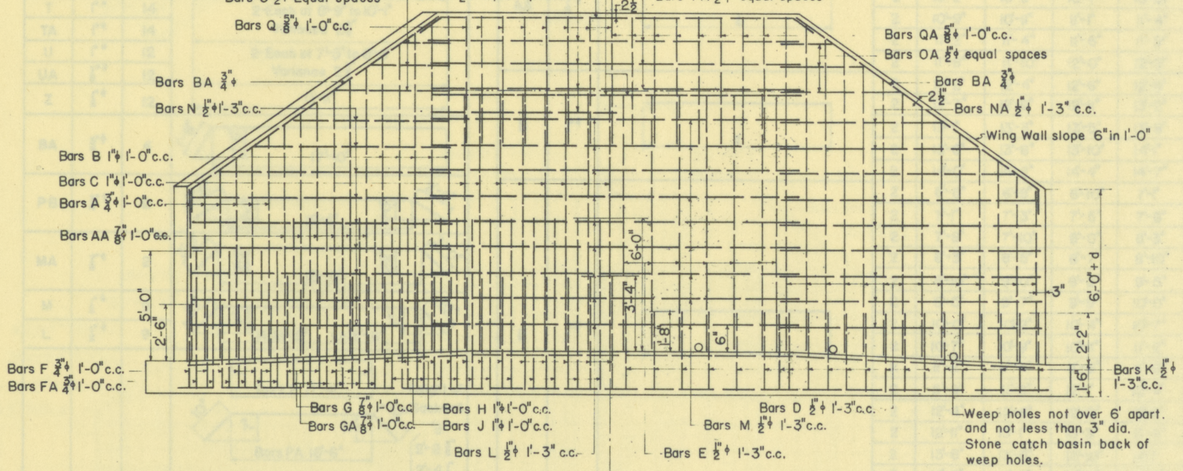


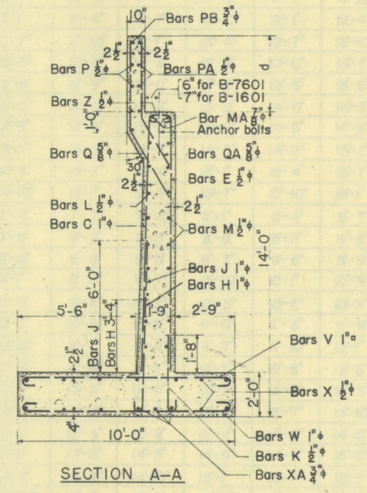




Tabulation (d) for Girder bridge with Timber deck		
Span	B-7601 d	B-1601 d
17'	2'-2⅝"	—
21'	2'-4⅞"	—
25'	2'-6⅜"	3'-0½"
28'	2'-6⅜"	—
33'	2'-9⅜"	3'-6⅜"
41'	3'-0⅜"	3'-9⅜"
49'	3'-0⅜"	4'-0½"
57'	3'-3⅜"	4'-3⅜"
65'	3'-6⅜"	4'-3⅜"

Table of Quantities (Approx.) d = 4'-3⅜"					
Height	Cubic Yards			Bags	Lbs
H	Concrete	Stone	Sand	Cement	Reinforcing Steel
14'	61	49	32	400	8800





Specifications
Reinforcing bars - F.S.Q.Q.-B-71
Type B-Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete - Class A 1½ - 6 Gals water per bag cement.
Chamfer all exposed edges 1".

Design Data
Horizontal Surcharge 300#/sq. ft.
fs = 16000#/sq. in.
fc = 650#/sq in - n = 15
This abutment may be founded on impervious clay or well cemented gravel in thick natural beds.

For bending diagram See Dwg. B-13606.

Note:
Masonry surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary. Anchor bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REINFORCED CONCRETE ABUTMENT-WING TYPE
FOR BEAM BRIDGES - 11 FT. ROADWAY
DWG. B-1601 AND B-7601
HEIGHT 14 FT.

DESIGNED M.W.W. DRAWN M.W.W.
CHECKED C.C.J. TRACED A.M. C.C.J.
RECOMMENDED FOR APPROVAL E.E.M. DATE Sept. 1935
APPROVED [signature] REGIONAL ENGINEER

R-7-DRAWING № B-13606

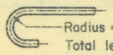
Bars	Size	No.	Description
C	1" ϕ	15	11'-9"
E	½" ϕ	14	11'-9"
X	½" ϕ	12	8 at 16'-6" 4 at 13'-0"
XA	⅜" ϕ	3	19'-0"
Y	½" ϕ	24	12 at 18'-11" 12 at 18'-3"
YA	¾" ϕ	6	20'-6"
F	⅜" ϕ	12	3'-8"
FA	¾" ϕ	12	6'-2"
G	⅜" ϕ	12	5'-0"
GA	⅞" ϕ	12	7'-8"
H	1" ϕ	25	5'-0"
J	1" ϕ	24	7'-8"
K	½" ϕ	42	3'-4"
V	1" □	17	Bars V & W 9'-7"
W	1" ϕ	17	2-Each at 6'-1" to 7'-2" Variance 2⅜"
R	1" ϕ	12	2-Each at 6'-1 to 7'-2" Variance 2⅜"
S	¾" ϕ	12	2-Each at 8'-9" to 10'-1" Variance 2⅜"
T	1" □	14	2-Each at 7'-5" to 8'-6" Variance 2⅜"
TA	1" ϕ	14	0'-11"
U	1" □	12	
UA	⅞" ϕ	12	
Z	½" ϕ	12	
BA	¾" ϕ	4	17'-10"
PB	¾" ϕ	2	16'-6"
MA	⅞" ϕ	2	13'-10"
M	½" ϕ	9	M=13'-10" L=15'-8"
L	½" ϕ	9	
P	½" ϕ	3	Bars P 17'-4" / Bars PA 16'-6" — P-Bars for each "d" / PA Bars for each "d"
PA	½" ϕ	2	
		4	P-Bars for each "d" / PA Bars for each "d"
		3	
		5	P Bars for each "d" / PA Bars for each "d"
		4	

Height of Backwall "d": 2'-2⅜" | 2'-4½" | 2'-6½" ± ⅛" | 2'-9⅜" | 3'-0½" ± ⅛" | 3'-3⅜" | 3'-6⅜" | 3'-9⅜" | 4'-0½" | 4'-3½" ± ⅛"

Bars	Size	Description	No.	Variable Dimensions – ℓ									
Q	⅝" ϕ	3'-6"	15	3'-0"	3'-2"	3'-4"	3'-7"	3'-10"	4'-1"	4'-4"	4'-7"	4'-10"	5'-1"
QA	⅝" ϕ	2'-8"	15	2'-2"	2'-4"	2'-6"	2'-9	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-3"
O	½" ϕ	ℓ	2	2'-9"	2'-11"	3'-1"	3'-4"	2'-8"	2'-10"	3'-0"	3'-2"	3'-4"	2'-10"
			2	4'-9"	5'-1"	5'-5"	5'-11"	4'-6"	4'-10"	5'-2"	5'-6"	5'-11"	4'-10"
			2	—	—	—	—	6'-5"	6'-11"	7'-5"	7'-11"	8'-5"	6'-11"
			2	—	—	—	—	—	—	—	—	—	8'-11"
OA	½" ϕ	7" 10° ℓ	2	2'-3"	2'-5"	2'-7"	2'-10"	2'-2"	2'- 4"	2'-6"	2'- 8"	2'- 10"	2'-4"
			2	4'-3"	4'-7"	4'-11"	5'-5"	4'-0"	4'- 4"	4'- 8"	5'- 0"	5'- 5"	4'-4"
			2	—	—	—	—	5'-11"	6'- 5"	6'-11"	7'- 5"	7'-11"	6'- 5"
			2	—	—	—	—	—	—	—	—	—	8'- 5"
A	¾" ϕ	ℓ	2	6'-6"	6'-8"	6'-10"	7'-1"	7'- 4"	7'- 7"	7'-10"	8'-1"	8'- 4"	8'- 7"
			2	6'-11"	7'-1"	7'-3"	7'-6"	7'-9"	8'- 0"	8'-3"	8'- 6"	8'- 9"	9'-0"
			2	7'-5"	7'-7"	7'-9"	8'-0"	8'-3"	8'- 6"	8'- 9"	9'-0"	9'- 3"	9'- 6"
			2	7'-11"	8'-1"	8'-3"	8'-6"	8'-9"	9'- 0"	9'- 3"	9'- 6"	9'- 9"	10'-0"
			2	8'-4"	8'- 6"	8'- 8"	8'-11"	9'- 2"	9'- 5"	9'- 8"	9'-11"	10'- 2"	10'- 5"
			2	8'-10"	9'-0"	9'- 2"	9'- 5"	9'- 8"	9'- 11"	10'- 2"	10'- 5"	10'- 8"	10'- 11"
AA	⅞" ϕ	ℓ	2	9'-4"	9'- 6"	9'- 8"	9'-11"	10'- 2"	10'- 5"	10'- 8"	10'- 11"	11'- 2"	11'- 5"
			2	9'-9"	9'-11"	10'-1"	10'-4"	10'-7"	10'-10"	11'-1"	11'- 4"	11'- 7"	11'-10"
			2	10'-3"	10'-5"	10'-7"	10'-10"	11'-1"	11'- 4"	11'- 7"	11'-10"	12'- 1"	12'-4"
			2	10'-9"	10'-11"	11'-1"	11'-4"	11'-7"	11'-10"	12'-1"	12'- 4"	12'- 7"	12'-10"
			2	11'-2"	11'- 4"	11'- 6"	11'- 9"	12'-0"	12'- 3"	12'- 6"	12'- 9"	13'- 0"	13'- 3"
			2	11'-8"	11'-10"	12'-0"	12'-3"	12'-6"	12'- 9"	13'-0"	13'- 3"	13'- 6"	13'- 9"
B	1" ϕ	ℓ	2	12'-2"	12'-4"	12'-6"	12'-9"	13'-0"	13'- 3"	13'- 6"	13'- 9"	14'- 0"	14'- 3"
			2	12'-7"	12'-9"	12'-11"	13'-2"	13'-5"	13'- 8"	13'-11"	14'- 2"	14'- 5"	14'- 8"
			2	13'-1"	13'-3"	13'-5"	13'-8"	13'-11"	14'- 2"	14'- 5"	14'- 8"	14'- 11"	15'- 2"
			2	13'-6"	13'-8"	13'-10"	14'-1"	14'-4"	14'- 7"	14'-10"	15'- 1"	15'- 4"	15'- 7"
			2	14'-0"	14'-2"	14'-4"	14'-7"	14'-10"	15'- 1"	15'- 4"	15'- 7"	15'-10"	16'- 1"
D	½" ϕ	ℓ	2	6'-6"	6'-8"	6'-10"	7'-1"	7'- 4"	7'- 7"	7'-10"	8'- 1"	8'- 4"	8'- 7"
			2	7'-1"	7'-3"	7'-5"	7'-8"	7'-11"	8'- 2"	8'- 5"	8'- 8"	8'-11"	9'- 2"
			2	7'-8"	7'-10"	8'-0"	8'-3"	8'-6"	8'- 9"	9'-0"	9'- 3"	9'- 6"	9'- 9"
			2	8'-3"	8'- 5"	8'- 7"	8'-10"	9'-1"	9'- 4"	9'- 7"	9'-10"	10'- 1"	10'- 4"
			2	8'-10"	9'-0"	9'- 2"	9'- 5"	9'- 8"	9'- 11"	10'- 2"	10'- 5"	10'- 8"	10'- 11"
			2	9'-5"	9'- 7"	9'- 9"	10'-0"	10'-3"	10'- 6"	10'- 9"	11'- 0"	11'- 3"	11'- 6"
			2	10'-0"	10'-2"	10'-4"	10'-7"	10'-10"	11'- 1"	11'- 4"	11'- 7"	11'- 10"	12'- 1"
			2	10'-7"	10'-9"	10'-11"	11'-2"	11'-5"	11'- 8"	11'- 11"	12'- 2"	12'- 5"	12'- 8"
			2	11'-2"	11'- 4"	11'- 6"	11'- 9"	12'-0"	12'- 3"	12'- 6"	12'- 9"	13'- 0"	13'- 3"
			2	11'-9"	11'-11"	12'-1"	12'-4"	12'-7"	12'-10"	13'-1"	13'- 4"	13'- 7"	13'-10"
			2	12'-4"	12'-6"	12'-8"	12'-11"	13'-2"	13'- 5"	13'- 8"	13'-11"	14'- 2"	14'- 5"
			2	12'-11"	13'-1"	13'-3"	13'-6"	13'-9"	14'- 0"	14'- 3"	14'- 6"	14'- 9"	15'- 0"
			2	13'-6"	13'-8"	13'-10"	14'-1"	14'-4"	14'- 7"	14'-10"	15'- 1"	15'- 4"	15'- 7"
			2	14'-0"	14'-2"	14'-4"	14'-7"	14'-10"	15'- 1"	15'- 4"	15'- 7"	15'-10"	16'-1"
N	½" ϕ	ℓ	10	18'-6"	18'-6"	18'-6"	18'-6"	—	—	—	—	—	—
			12	—	—	—	—	18'-6"	18'- 6"	18'-6"	18'-6"	18'-6"	—
			14	—	—	—	—	—	—	—	—	—	18'-6"
			2	17'-3"	17'-7"	17'-11"	18'-4"	16'-5"	16'- 11"	17'-5"	17'-11"	18'- 4"	16'-5
			2	14'-9"	15'-1"	15'-5"	15'-11"	13'-11"	14'- 5"	14'-11"	15'- 5"	15'- 11"	13'-11"
			2	12'-3"	12'-7"	12'-11"	13'-5"	11'-5"	11'-11"	12'-5"	12'-11"	13'- 5"	—
			2	9'-9"	10'-1"	10'-5"	10'-11"	—	—	—	—	—	—
NA	½" ϕ	7" 10° ℓ	10	17'-11"	17'-11"	17'-11"	17'-11"	—	—	—	—	—	—
			12	—	—	—	—	17'-11"	17'-11"	17'-11"	17'-11"	17'-11"	—
			14	—	—	—	—	—	—	—	—	—	17'-11"
			2	16'-8"	17'-0"	17'-4"	17'-9"	15'-10"	16'- 4"	16'-10"	17'- 4"	17'- 9"	15'-10"
			2	14'-2"	14'-6"	14'-10"	15'-4"	13'-4"	13'-10"	14'-4"	14'-10"	15'- 4"	13'-4"
			2	11'-8"	12'-0"	12'-4"	12'-10"	10'-10"	11'- 4"	11'-10"	12'- 4"	12'-10"	—
			2	9'-2"	9'-6"	9'-10"	10'-4"	—	—	—	—	—	—

Tabulation (d) for Girder bridges with Timber deck

Span	B-7601 d	B-1601 d
17'	2'-2⅜"	—
21'	2'-4½"	—
25'	2'-6⅜"	3'-0½"
28'	2'-6⅜"	—
33'	2'-9⅜"	3'-6⅜"
41'	3'-0⅜"	3'-9⅜"
49'	3'-0⅜"	4'-0½"
57'	3'-3⅜"	4'-2⅜"
65'	3'-6⅜"	4'-3⅜"



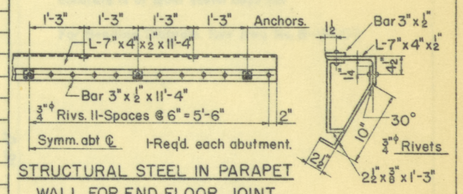
Radius = 3 diam. of bar.
Total length of hook at least 16 bar diameters.

TYPICAL HOOK

Note: Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

Specifications
Reinforcing bars – F.S.Q.Q.–B-71
Type B-Grade-1 (Deformed Structural)
Class A (Open Hearth Steel)

Total approximate weight 8,800 # d = 4'-3⅜"



STRUCTURAL STEEL IN PARAPET WALL FOR END FLOOR JOINT

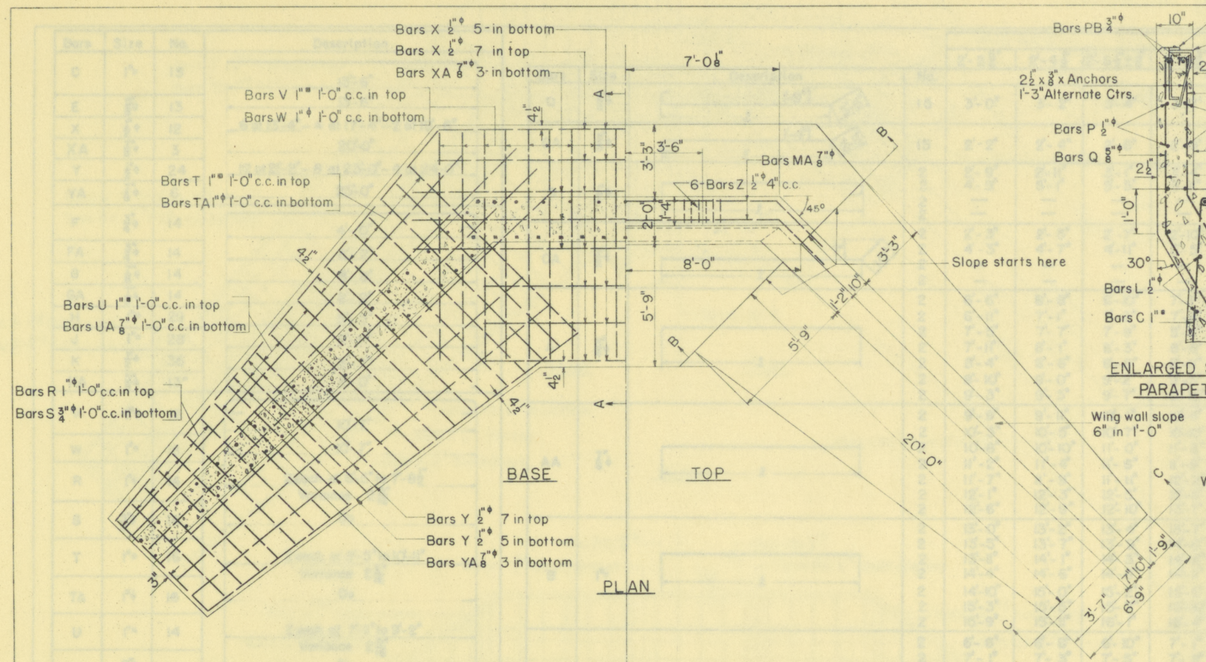
DETAIL OF ANCHORS.

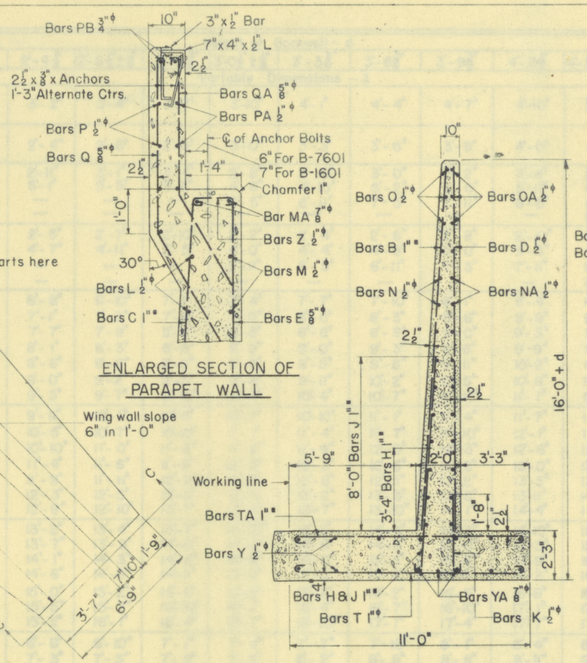
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. B-13602
FOR BEAM BRIDGES DWG. B-1601 AND B-7601
HEIGHT 14'-0"

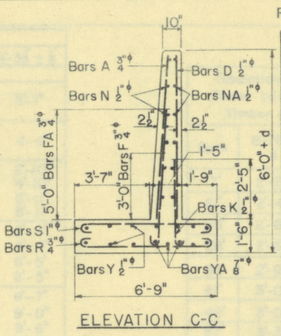
DESIGNED C.C.J. DRAWN A.H.B.
CHECKED C.C.J. TRACED A.H.B.
RECOMMENDED FOR APPROVAL E.E.M. DATE SEPT. 1935 C.C.J.
APPROVED Jesse A. Stewart REGIONAL ENGINEER

REVISED DEC. 16-1935.

R-7-DRAWING Nº B-13603







Tabulation (d) for Girder bridges with Timber deck		
Span	B-7601 d	B-1601 d
17'	2'-2 5/8"	—
21'	2'-4 ½"	—
25'	2'-6 3/8"	3'-0 ½"
28'	2'-6 5/8"	—
33'	2'-9 3/8"	3'-6 3/8"
41'	3'-0 5/8"	3'-9 5/8"
49'	3'-0 5/8"	4'-0 ½"
57'	3'-3 3/8"	4'-3 3/8"
65'	3'-6 5/8"	4'-3 3/8"

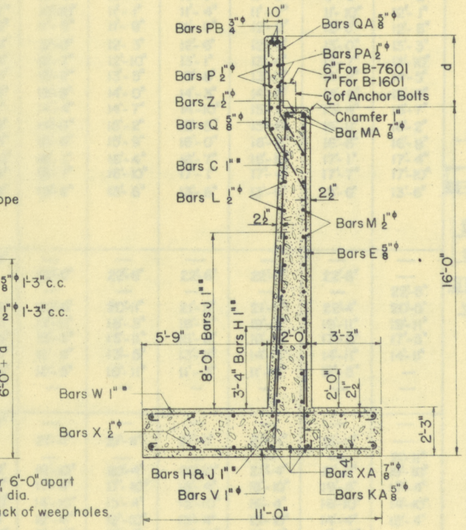
Table of Quantities (Approx.) d = 4'-3 5/8"					
Height	Cubic Yards			Bags	Pounds
H	Concrete	Stone	Sand	Cement	Reinfg. Stl.
16'	82	66	41	538	11,500

Specifications
Reinforcing bars – F.S.Q.Q.-B-71
Type B-Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete - Class A 1½ - 6 Gals. water per bag of cement.
Chamfer all exposed edges 1".

Design Data.
Horizontal Surcharge 300#/sq. ft.
fs = 16,000#/sq. in.
fc = 650#/sq. in. n = 15
This abutment may be founded on impervious clay or well cemented gravel in thick natural beds.

NOTE: Masonry surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary. Anchor bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

For Bending Diagram See Dwg. No. B-13607.



U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REINFORCED CONCRETE ABUTMENT - WING TYPE
FOR BEAM BRIDGES - 11 FT. ROADWAY
DWG. B-1601 AND B-7601
HEIGHT 16 FT.

DESIGNED W.W.W. DRAWN A.H.B.
CHECKED C.C.J. TRACED A.H.B. C.C.J.
RECOMMENDED FOR APPROVAL E.E.M. DATE AUGUST 1935
APPROVED ... REGIONAL ENGINEER

R-7-DRAWING Nº B-13607

Bars	Size	No.	Description
C	1"□	15	13'-6"
E	$\frac{5}{8}$"ϕ	13	13'-6"
X	$\frac{1}{2}$"ϕ	12	6 at 13'-4" – 4 at 17'-4" – 2 at 19'-6"
XA	$\frac{1}{2}$"ϕ	3	20'-0"
Y	$\frac{1}{2}$"ϕ	24	12 at 21'-2" – 8 at 23'-0" – 4 at 24'-0"
YA	$\frac{7}{8}$"ϕ	6	25'-0"
F	$\frac{3}{4}$"ϕ	14	4'-0"
FA	$\frac{3}{4}$"ϕ	14	6'-2"
G	$\frac{7}{8}$"ϕ	14	4'-8"
GA	$\frac{7}{8}$"ϕ	14	8'-2"
H	1"□	29	5'-3"
J	1"□	28	9'-11"
K	$\frac{1}{2}$"ϕ	36	3'-7"
KA	$\frac{5}{8}$"ϕ	13*	4'-0"
V	1"ϕ	18	10'-7"
W	1"□	18	10'-7"
R	1"ϕ	14	2 each at 6'-5" to 7'-8½" Variance 2 $\frac{9}{16}$"
S	$\frac{3}{4}$"ϕ	14	Do
T	1"□	16	2 each at 9'-5" to 10'-11" Variance 2 $\frac{9}{16}$"
TA	1"ϕ	16	Do
U	1"□	14	2 each at 7'-11" to 9'-2" Variance 2 $\frac{9}{16}$"
UA	$\frac{7}{8}$"ϕ	14	Do
Z	$\frac{1}{2}$"ϕ	12	0'-11"
PB	$\frac{3}{4}$"ϕ	2	16'-6", 2'-0", 2'-0"
MA	$\frac{7}{8}$"ϕ	2	13'-10", 2'-2"
M	$\frac{1}{2}$"ϕ	11	13'-10", 7", 10"
L	$\frac{1}{2}$"ϕ	11	15'-8"
BA	$\frac{3}{4}$"ϕ	4	22'-3", 1'-6"
P	$\frac{1}{2}$"ϕ	3	P Bars for each d
PA	$\frac{1}{2}$"ϕ	2	PA Bars for each d
		4	P Bars for each d
		3	PB Bars for each d
		5	P Bars for each d
		4	PB Bars for each d

Bars PA 16'-6"; Bars P 17'-4"; 7", 10"

Height of Backwall d: 2'-2⅝", 2'-4½", 2'-6½" ± ⅛", 2'-9⅝", 3'-0½" ± ⅛", 3'-3⅜", 3'-6⅝", 3'-9⅝", 4'-0½", 4'-3½" ± ⅛"

Bars	Size	Description	No.	Variable Dimensions — ℓ									
Q	$\frac{5}{8}$"ϕ	1'-9", 3'-6"	15	3'-0"	3'-2"	3'-4"	3'-7"	3'-10"	4'-1"	4'-4"	4'-7"	4'-10"	5'-1"
QA	$\frac{5}{8}$"ϕ	1'-4", 2'-8"	15	2'-2"	2'-4"	2'-6"	2'-9"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-3"
O	$\frac{1}{2}$"ϕ		2	2'-9"	2'-11"	3'-1"	3'-4"	2'-8"	2'-10"	3'-0"	3'-2"	3'-4"	2'-10"
			2	4'-9"	5'-1"	5'-5"	5'-11"	4'-6"	4'-10"	5'-2"	5'-6"	5'-11"	4'-10"
			2	—	—	—	—	6'-5"	6'-11"	7'-5"	7'-11"	8'-5"	6'-11"
			2	—	—	—	—	—	—	—	—	—	8'-11"
OA	$\frac{1}{2}$"ϕ	7", 10"	2	2'-3"	2'-5"	2'-7"	2'-10"	2'-2"	2'-4"	2'-6"	2'-8"	2'-10"	2'-4"
			2	4'-3"	4'-7"	4'-11"	5'-5"	4'-0"	4'-4"	4'-8"	5'-0"	5'-5"	4'-4"
			2	—	—	—	—	5'-11"	6'-5"	6'-11"	7'-5"	7'-11"	6'-5"
			2	—	—	—	—	—	—	—	—	—	8'-5"
A	$\frac{3}{4}$"ϕ		2	6'-6"	6'-8"	6'-10"	7'-1"	7'-4"	7'-7"	7'-10"	8'-1"	8'-4"	8'-7"
			2	6'-11"	7'-1"	7'-3"	7'-6"	7'-9"	8'-0"	8'-3"	8'-6"	8'-9"	9'-0"
			2	7'-5"	7'-7"	7'-9"	8'-0"	8'-3"	8'-6"	8'-9"	9'-0"	9'-3"	9'-6"
			2	7'-11"	8'-1"	8'-3"	8'-6"	8'-9"	9'-0"	9'-3"	9'-6"	9'-9"	10'-0"
			2	8'-4"	8'-6"	8'-8"	8'-11"	9'-2"	9'-5"	9'-8"	9'-11"	10'-2"	10'-5"
			2	8'-10"	9'-0"	9'-2"	9'-5"	9'-8"	9'-11"	10'-2"	10'-5"	10'-8"	10'-11"
			2	9'-3"	9'-5"	9'-7"	9'-10"	10'-1"	10'-4"	10'-7"	10'-10"	11'-1"	11'-4"
AA	$\frac{7}{8}$"ϕ		2	9'-9"	9'-11"	10'-1"	10'-4"	10'-7"	10'-10"	11'-1"	11'-4"	11'-7"	11'-10"
			2	10'-3"	10'-5"	10'-7"	10'-10"	11'-1"	11'-4"	11'-7"	11'-10"	12'-1"	12'-4"
			2	10'-8"	10'-10"	11'-0"	11'-3"	11'-6"	11'-9"	12'-0"	12'-3"	12'-6"	12'-9"
			2	11'-2"	11'-4"	11'-6"	11'-9"	12'-0"	12'-3"	12'-6"	12'-9"	13'-0"	13'-3"
			2	11'-7"	11'-9"	11'-11"	12'-2"	12'-5"	12'-8"	12'-11"	13'-2"	13'-5"	13'-8"
			2	12'-1"	12'-3"	12'-5"	12'-8"	12'-11"	13'-2"	13'-5"	13'-8"	13'-11"	14'-2"
			2	12'-6"	12'-8"	12'-10"	13'-1"	13'-4"	13'-7"	13'-10"	14'-1"	14'-4"	14'-7"
B	1"□		2	13'-0"	13'-2"	13'-4"	13'-7"	13'-10"	14'-1"	14'-4"	14'-7"	14'-10"	15'-1"
			2	13'-5"	13'-7"	13'-9"	14'-0"	14'-3"	14'-6"	14'-9"	15'-0"	15'-3"	15'-6"
			2	13'-11"	14'-1"	14'-3"	14'-6"	14'-9"	15'-0"	15'-3"	15'-6"	15'-9"	16'-0"
			2	14'-4"	14'-6"	14'-8"	14'-11"	15'-2"	15'-5"	15'-8"	15'-11"	16'-2"	16'-5"
			2	14'-10"	15'-0"	15'-2"	15'-5"	15'-8"	15'-11"	16'-2"	16'-5"	16'-8"	16'-11"
			2	15'-3"	15'-5"	15'-7"	15'-10"	16'-1"	16'-4"	16'-7"	16'-10"	17'-1"	17'-4"
			2	15'-9"	15'-11"	16'-1"	16'-4"	16'-7"	16'-10"	17'-1"	17'-4"	17'-7"	17'-10"
D	$\frac{1}{2}$"ϕ		2	6'-6"	6'-8"	6'-10"	7'-1"	7'-4"	7'-7"	7'-10"	8'-1"	8'-4"	8'-7"
			2	7'-1"	7'-3"	7'-5"	7'-8"	7'-11"	8'-2"	8'-5"	8'-8"	8'-11"	9'-2"
			2	7'-8"	7'-10"	8'-0"	8'-3"	8'-6"	8'-9"	9'-0"	9'-3"	9'-6"	9'-9"
			2	8'-3"	8'-5"	8'-7"	8'-10"	9'-1"	9'-4"	9'-7"	9'-10"	10'-1"	10'-4"
			2	8'-10"	9'-0"	9'-2"	9'-5"	9'-8"	9'-11"	10'-2"	10'-5"	10'-8"	10'-11"
			2	9'-5"	9'-7"	9'-9"	10'-0"	10'-3"	10'-6"	10'-9"	11'-0"	11'-3"	11'-6"
			2	10'-0"	10'-2"	10'-4"	10'-7"	10'-10"	11'-1"	11'-4"	11'-7"	11'-10"	12'-1"
			2	10'-7"	10'-9"	10'-11"	11'-2"	11'-5"	11'-8"	11'-11"	12'-2"	12'-5"	12'-8"
			2	11'-2"	11'-4"	11'-6"	11'-9"	12'-0"	12'-3"	12'-6"	12'-9"	13'-0"	13'-3"
			2	11'-9"	11'-11"	12'-1"	12'-4"	12'-7"	12'-10"	13'-1"	13'-4"	13'-7"	13'-10"
			2	12'-4"	12'-6"	12'-8"	12'-11"	13'-2"	13'-5"	13'-8"	13'-11"	14'-2"	14'-5"
			2	12'-11"	13'-1"	13'-3"	13'-6"	13'-9"	14'-0"	14'-3"	14'-6"	14'-9"	15'-0"
			2	13'-6"	13'-8"	13'-10"	14'-1"	14'-4"	14'-7"	14'-10"	15'-1"	15'-4"	15'-7"
			2	14'-1"	14'-3"	14'-5"	14'-8"	14'-11"	15'-2"	15'-5"	15'-8"	15'-11"	16'-2"
			2	14'-8"	14'-10"	15'-0"	15'-3"	15'-6"	15'-9"	16'-0"	16'-3"	16'-6"	16'-9"
			2	15'-3"	15'-5"	15'-7"	15'-10"	16'-1"	16'-4"	16'-7"	16'-10"	17'-1"	17'-4"
			2	15'-9"	15'-11"	16'-1"	16'-4"	16'-7"	16'-10"	17'-1"	17'-4"	17'-7"	17'-10"
			2	13'-6"	13'-6"	13'-6"	13'-6"	13'-6"	13'-6"	13'-6"	13'-6"	13'-6"	13'-6"
N	$\frac{1}{2}$"ϕ		10	22'-6"	22'-6"	22'-6"	22'-6"	—	—	—	—	—	—
			12	—	—	—	—	22'-6"	22'-6"	22'-6"	22'-6"	22'-6"	—
			14	—	—	—	—	—	—	—	—	—	22'-6"
			2	21'-3"	21'-7"	21'-11"	22'-4"	20'-5"	20'-11"	21'-5"	21'-11"	22'-4"	20'-5"
			2	18'-9"	19'-1"	19'-5"	19'-11"	17'-11"	18'-5"	18'-11"	19'-5"	19'-11"	19'-11"
			2	16'-3"	16'-7"	16'-11"	17'-5"	15'-5"	15'-11"	16'-5"	16'-11"	17'-5"	17'-5"
			2	13'-9"	14'-11"	14'-5"	14'-11"	12'-11"	13'-5"	13'-11"	14'-5"	14'-11"	14'-11"
			2	11'-3"	11'-7"	11'-11"	12'-5"	10'-5"	10'-11"	11'-5"	11'-11"	12'-5"	—
			2	8'-9"	9'-1"	9'-5"	9'-11"	—	—	—	—	—	—
NA	$\frac{1}{2}$"ϕ	7", 10"	10	21'-11"	21'-11"	21'-11"	21'-11"	—	—	—	—	—	—
			12	—	—	—	—	21'-11"	21'-11"	21'-11"	21'-11"	21'-11"	—
			14	—	—	—	—	—	—	—	—	—	21'-11"
			2	20'-8"	21'-0"	21'-4"	21'-9"	19'-10"	20'-4"	20'-10"	21'-4"	21'-9"	19'-10"
			2	18'-2"	18'-6"	18'-10"	19'-4"	17'-4"	17'-10"	18'-4"	18'-10"	19'-4"	17'-4"
			2	15'-8"	16'-0"	16'-4"	16'-10"	14'-10"	15'-4"	15'-10"	16'-4"	16'-10"	14'-10"
			2	13'-2"	13'-6"	13'-10"	14'-4"	12'-4"	12'-10"	13'-4"	13'-10"	14'-4"	12'-4"
			2	10'-8"	11'-0"	11'-4"	11'-10"	9'-10"	10'-4"	10'-10"	11'-4"	11'-10"	—
			2	8'-2"	8'-6"	8'-10"	9'-4"	—	—	—	—	—	—

Tabulation (d) for Girder bridges with Timber (deck

Span	B-7601 d	B-1601 d
17'	2'-2⅝"	—
21'	2'-4½"	—
25'	2'-6⅝"	3'-0½"
28'	2'-8"	—
33'	2'-9⅝"	3'-6⅝"
41'	3'-0⅝"	3'-9⅝"
49'	3'-0⅝"	4'-0½"
57'	3'-3⅜"	4'-3⅜"
65'	3'-6⅜"	4'-3⅜"

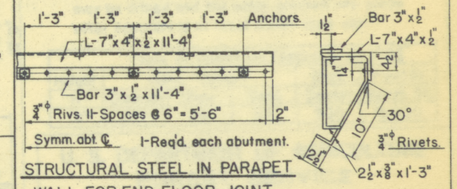
Radius = 3 diam. of bar.
Total length of hook at least 16 bar diameters.

TYPICAL HOOK

Note: Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

Specifications
Reinforcing bars – F.S.Q.Q.- B-71
Type B-Grade 1 (Deformed Structural)
Class A (Open Hearth Steel)

Total approximate weight 11,500# d = 4'-3⅝"



STRUCTURAL STEEL IN PARAPET WALL FOR END FLOOR JOINT

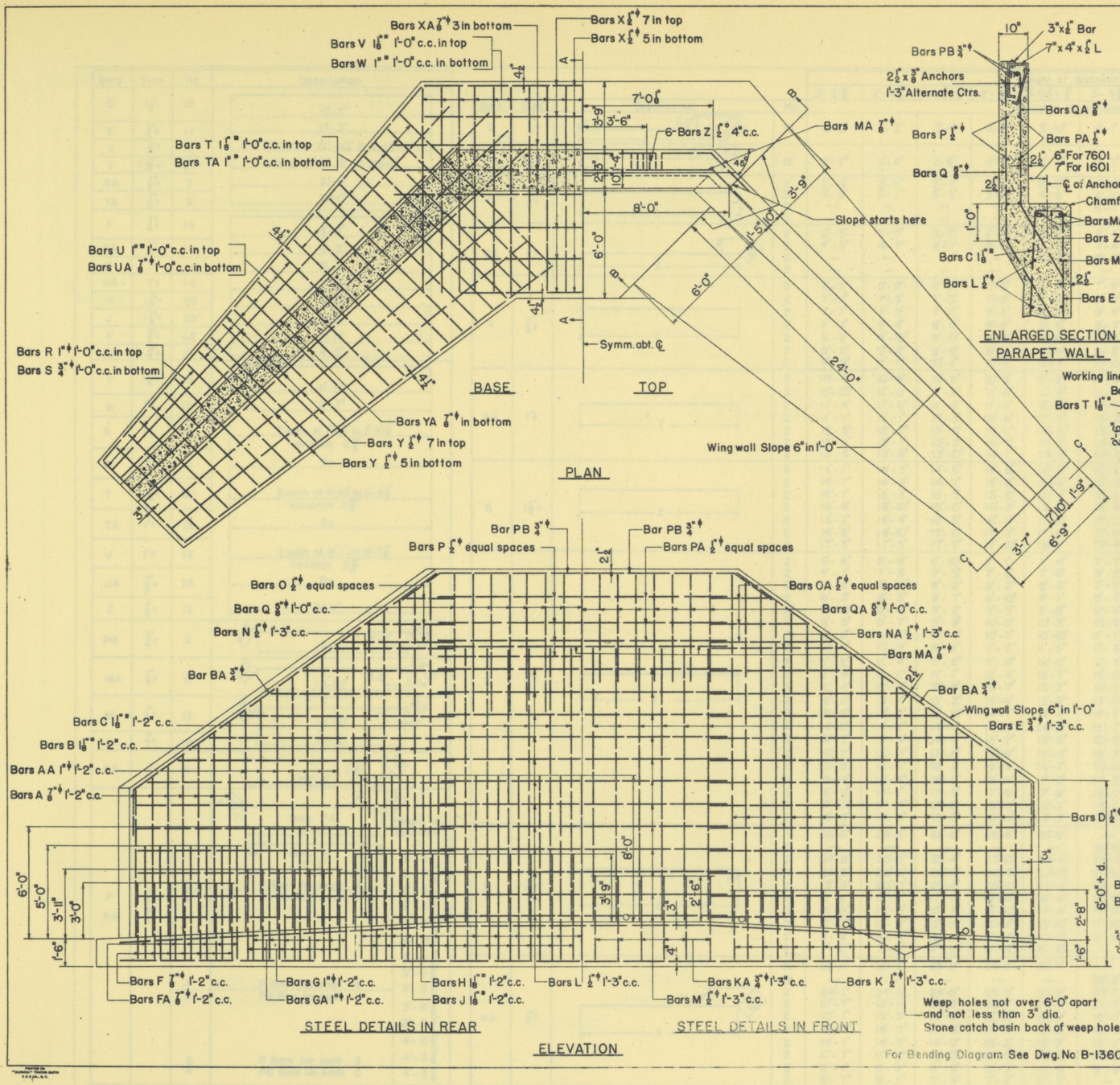
DETAIL OF ANCHORS.

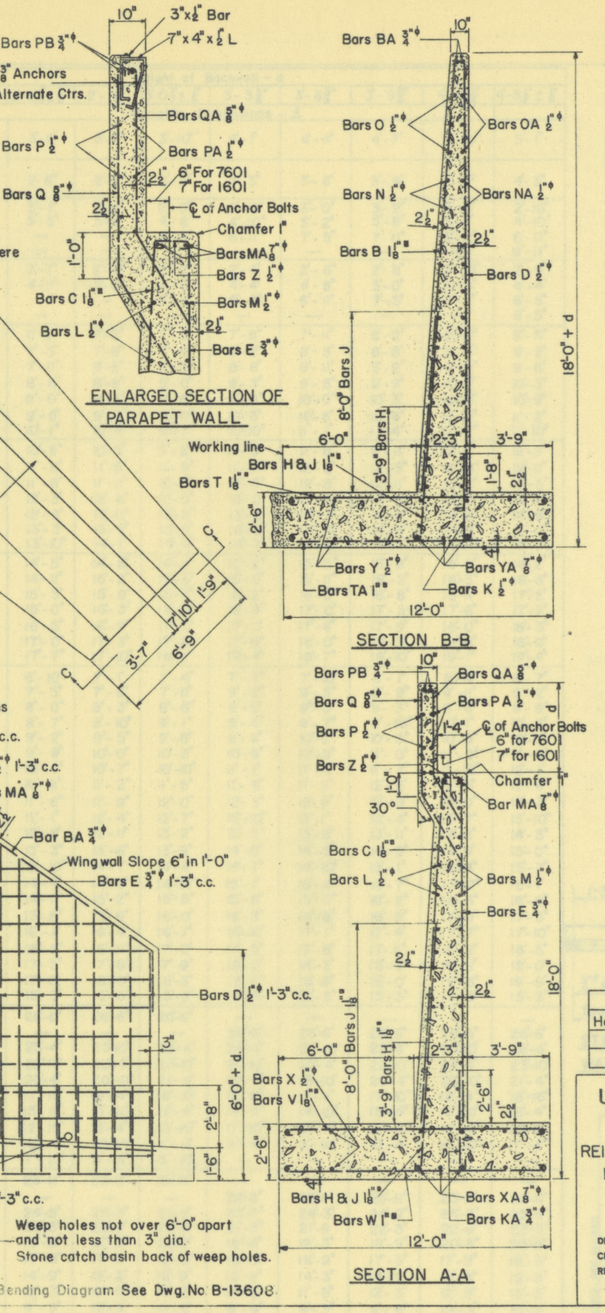
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY
STANDARD WING TYPE ABUTMENT DWG. B-13603
FOR BEAM BRIDGES DWG. B-1601 AND B-7601

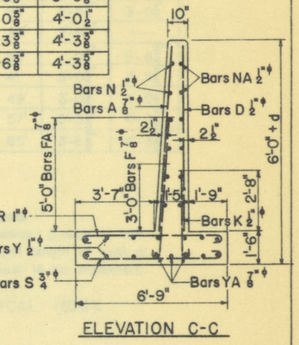
DESIGNED M.W.W. H = 16'-0" DRAWN M.W.W.
CHECKED C.C.J. TRACED A.M. C.C.J.
RECOMMENDED FOR APPROVAL E.B.M. DATE Sept. 1935
APPROVED J.E. Bond REGIONAL ENGINEER

REVISED DEC. 16-1935.

R-7-DRAWING Nº B-13604







Tabulation (d) for Girder bridges with Timber deck		
Span	B-760I d	B-160I d
17'	2'-2⅝"	—
21'	2'-4½"	—
25'	2'-6⅝"	3'-0½"
28'	2'-6⅝"	—
33'	2'-9⅝"	3'-6⅝"
41'	3'-0⅝"	3'-9⅝"
49'	3'-0⅝"	4'-0½"
57'	3'-3⅝"	4'-3⅝"
65'	3'-6⅝"	4'-3⅝"

Specifications
Reinforcing bars - F.S.Q.Q. - B-71
Type B-Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete - Class A 1½ - 6 Gals. water per bag of cement.
Chamfer all exposed edges 1".

Design Data.
Horizontal Surcharge 300#/sq. ft.
fs = 16,000#/sq. in.
fc = 650#/sq. in. n = 15
This abutment may be founded on impervious clay or well cemented gravel in thick natural beds.

NOTE: Masonry surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary. Anchor bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

Table of Quantities (Approx.) d = 4'-3⅝"					
Height	Cubic Yards			Bags	Pounds
H	Concrete	Stone	Sand	Cement	Reinfg. Stl.
18'	107	86	54	700	15,000

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REINFORCED CONCRETE ABUTMENT - WING TYPE
FOR BEAM BRIDGES - 11 FT. ROADWAY
DWG. B-160I AND B-760I
HEIGHT 18 FT.

DESIGNED W. W. W.
CHECKED C. C. J.
RECOMMENDED FOR APPROVAL E. W. M.
DRAWN A.H.B.
TRACED A.H.B.
DATE AUGUST 1935
APPROVED REGIONAL ENGINEER

For Bending Diagram See Dwg. No. B-13608

R-7-DRAWING Nº B-13608

Bars	Size	No.	Description
C	1⅛" □	12	15'-3"
E	¾" ϕ	12	15'-3"
X	½" ϕ	12	4 at 18'-0" 2 at 20'-10" 6 at 14'-6"
Y	½" ϕ	24	12 at 27'-3" 12 at 25'-6"
XA	⅞" ϕ	3	21'-0"
YA	⅞" ϕ	6	29'-0"
F	⅞" ϕ	14	4'-3"
FA	⅞" ϕ	14	6'-3"
G	1" ϕ	14	5'-2"
GA	1" ϕ	14	7'-3"
H	1⅛" □	26	6'-0"
J	1⅛" □	25	10'-3"
K	½" ϕ	42	3'-11"
KA	¾" ϕ	12	4'-9"
V	1⅛" □	19	11'-7"
W	1" □	19	11'-7"
R	1" ϕ	16	2 each at 6'-4" to 7'-10¼" Variance 2⅝"
S	¾" ϕ	16	Do
T	1⅛" □	20	2 each at 9'-10" to 11'-9½" Variance 2⅝"
TA	1" □	20	Do
U	1" □	16	2 each at 8'-1" to 9'-7¼" Variance 2⅝"
UA	⅞" ϕ	16	Do
Z	½" ϕ	12	0'-11"
PB	¾" ϕ	2	2'-0" 16'-6" 2'-0"
MA	⅞" ϕ	2	2'-0" 13'-10" 2'-2"
M	½" ϕ	12	1'-0" 13'-10" 7" 1'-10"
L	½" ϕ	12	15'-8"
BA	¾" ϕ	4	1'-6" 26'-9" 1'-6"
P	½" ϕ	3	P Bars for each d
PA	½" ϕ	2	PA Bars for each d
		4	P Bars for each d
		3	PB Bars for each d
		5	P Bars for each d
		4	PB Bars for each d

Bars PA 16'-6" — Bars P 17'-4" — 1'-0" — 7"

Height of Backwall d: 2'-2⅝" · 2'-4½" · 2'-6⅜" ± 1⅛" · 2'-9⅜" · 3'-0½" ± ⅛" · 3'-3⅜" · 3'-6⅜" · 3'-9⅜" · 4'-0⅜" · 4'-3½" ± 1⅛"

Bars	Size	Description	No.	Variable Dimensions – ℓ									
Q	⅝" ϕ	1'-9" 3'-6" ℓ	15	3'-0"	3'-2"	3'-4"	3'-7"	3'-10"	4'-1"	4'-4"	4'-7"	4'-10"	5'-1"
QA	⅝" ϕ	1'-4" 2'-8" ℓ	15	2'-2"	2'-4"	2'-6"	2'-9"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-3"
O	½" ϕ	ℓ	2	2'-9"	2'-11"	3'-1"	3'-4"	2'-8"	2'-10"	3'-0"	3'-2"	3'-4"	2'-10"
			2	4'-9"	5'-1"	5'-5"	5'-11"	4'-6"	4'-10"	5'-2"	5'-6"	5'-11"	4'-10"
			2	—	—	—	—	6'-5"	6'-11"	7'-5"	7' 11"	8'-5"	6'-11"
			2	—	—	—	—	—	—	—	—	—	8'-11"
OA	½" ϕ	7" 10" ℓ	2	2'-3"	2'-5"	2'-7"	2'-10"	2'-2"	2'-4"	2'-6"	2'-8"	2'-10"	2'-4"
			2	4'-3"	4'-7"	4'-11"	5'-5"	4'-0"	4'-4"	4'-8"	5'-0"	5'-5"	4'-4"
			2	—	—	—	—	5'-11"	6'-5"	6'-11"	7'-5"	7'-11"	6'-5"
			2	—	—	—	—	—	—	—	—	—	8'-5"
A	⅞" ϕ	ℓ	2	6'-7"	6'-9"	6'-11"	7'-2"	7'-5"	7'-8"	7'-11"	8'-2"	8'-5"	8'-8"
			2	7'-1"	7'-3"	7'-5"	7'-8"	7'-11"	8'-2"	8'-5"	8'-8"	8'-11"	9'-2"
			2	7'-7"	7'-9"	7'-11"	8'-2"	8'-5"	8'-8"	8'-11"	9'-2"	9'-5"	9'-8"
			2	8'-2"	8'-4"	8'-6"	8'-9"	9'-0"	9'-3"	9'-6"	9'-9"	10'-0"	10'-3"
			2	8'-8"	8'-10"	9'-0"	9'-3"	9'-6"	9'-9"	10'-0"	10'-3"	10'-6"	10'-9"
			2	9'-2"	9'-4"	9'-6"	9'-9"	10'-0"	10'-3"	10'-6"	10'-9"	11'-0"	11'-3"
			2	9'-9"	9'-11"	10'-1"	10'-4"	10'-7"	10'-10"	11'-1"	11'-4"	11'-7"	11'-10"
AA	1" ϕ	ℓ	2	10'-4"	10'-6"	10'-8"	10'-11"	11'-2"	11'-5"	11'-8"	11'-11"	12'-2"	12'-5"
			2	10'-10"	11'-0"	11'-2"	11'-5"	11'-8"	11'-11"	12'-2"	12'-5"	12'-8"	12'-11"
			2	11'-4"	11'-6"	11'-8"	11'-11"	12'-2"	12'-5"	12'-8"	12'-11"	13'-2"	13'-5"
			2	11'-11"	12'-1"	12'-3"	12'-6"	12'-9"	13'-0"	13'-3"	13'-6"	13'-9"	14'-0"
			2	12'-5"	12'-7"	12'-9"	13'-0"	13'-3"	13'-6"	13'-9"	14'-0"	14'-3"	14'-6"
			2	12'-11"	13'-1"	13'-3"	13'-6"	13'-9"	14'-0"	14'-3"	14'-6"	14'-9"	15'-0"
			2	13'-6"	13'-8"	13'-10"	14'-1"	14'-4"	14'-7"	14'-10"	15'-1"	15'-4"	15'-7"
B	1⅛" □	ℓ	2	14'-1"	14'-3"	14'-5"	14'-8"	14'-11"	15'-2"	15'-5"	15'-8"	15'-11"	16'-2"
			2	14'-7"	14'-9"	14'-11"	15'-2"	15'-5"	15'-8"	15'-11"	16'-2"	16'-5"	16'-8"
			2	15'-1"	15'-3"	15'-5"	15'-8"	15'-11"	16'-2"	16'-5"	16'-8"	16'-11"	17'-2"
			2	15'-8"	15'-10"	16'-0"	16'-3"	16'-6"	16'-9"	17'-0"	17'-3"	17'-6"	17'-9"
			2	16'-2"	16'-4"	16'-6"	16'-9"	17'-0"	17'-3"	17'-6"	17'-9"	18'-0"	18'-3"
			2	16'-8"	16'-10"	17'-0"	17'-3"	17'-6"	17'-9"	18'-0"	18'-3"	18'-6"	18'-9"
			2	17'-3"	17'-5"	17'-7"	17'-10"	18'-1"	18'-4"	18'-7"	18'-10"	19'-1"	19'-4"
D	½" ϕ	ℓ	2	6'-6"	6'-8"	6'-10"	7'-1"	7'-4"	7'-7"	7'-10"	8'-1"	8'-4"	8'-7"
			2	7'-1"	7'-3"	7'-5"	7'-8"	7'-11"	8'-2"	8'-5"	8'-8"	8'-11"	9'-2"
			2	7'-8"	7'-10"	8'-0"	8'-3"	8'-6"	8'-9"	9'-0"	9'-3"	9'-6"	9'-9"
			2	8'-3"	8'-5"	8'-7"	8'-10"	9'-1"	9'-4"	9'-7"	9'-10"	10'-1"	10'-4"
			2	8'-10"	9'-0"	9'-2"	9'-5"	9'-8"	9'-11"	10'-2"	10'-5"	10'-8"	10'-11"
			2	9'-5"	9'-7"	9'-9"	10'-0"	10'-3"	10'-6"	10'-9"	11'-0"	11'-3"	11'-6"
			2	10'-0"	10'-2"	10'-4"	10'-7"	10'-10"	11'-1"	11'-4"	11'-7"	11'-10"	12'-1"
			2	10'-7"	10'-9"	10'-11"	11'-2"	11'-5"	11'-8"	11'-11"	12'-2"	12'-5"	12'-8"
			2	11'-2"	11'-4"	11'-6"	11'-9"	12'-0"	12'-3"	12'-6"	12'-9"	13'-0"	13'-3"
			2	11'-9"	11'-11"	12'-1"	12'-4"	12'-7"	12'-10"	13'-1"	13'-4"	13'-7"	13'-10"
			2	12'-4"	12'-6"	12'-8"	12'-11"	13'-2"	13'-5"	13'-8"	13'-11"	14'-2"	14'-5"
			2	12'-11"	13'-1"	13'-3"	13'-6"	13'-9"	14'-0"	14'-3"	14'-6"	14'-9"	15'-0"
			2	13'-6"	13'-8"	13'-10"	14'-1"	14"-4"	14'-7"	14'-10"	15'-1"	15'-4"	15'-7"
			2	14'-0"	14'-2"	14'-4"	14'-7"	14'-10"	15'-1"	15'-4"	15'-7"	15'-10"	16'-1"
			2	14'-7"	14'-9"	14'-11"	15'-2"	15'-5"	15'-8"	15'-11"	16'-2"	16'-5"	16'-8"
			2	15'-2"	15'-4"	15'-6"	15'-9"	16'-0"	16'-3"	16'-6"	16'-9"	17'-0"	17'-3"
			2	15'-9"	15'-11"	16'-1"	16'-4"	16'-7"	16'-10"	17'-1"	17'-4"	17'-7"	17'-10"
			2	16'-4"	16'-6"	16'-8"	16'-11"	17'-2"	17'-5"	17'-8"	17'-11"	18'-2"	18'-5"
			2	16'-11"	17'-1"	17'-3"	17'-6"	17'-9"	18'-0"	18'-3"	18'-6"	18'-9"	19'-0"
			2	17'-5"	17'-7"	17'-8"	18'-0"	18'-3"	18'-6"	18'-9"	19'-0"	19'-3"	19'-6"
			2	15'-3"	15'-3"	15'-3"	15'-3"	15'-3"	15'-3"	15'-3"	15'-3"	15'-3"	15'-3"
N	½" ϕ	ℓ	10	26'-6"	26'-6"	26'-6"	26'-6"	26'-6"	—	—	—	—	—
			12	—	—	—	—	—	26'-6"	26'-6"	26'-6"	26'-6"	26'-6"
			2	24'-8"	25'-0"	25'-4"	25'-10"	26'-4"	24'-4"	24'-10"	25'-4"	25"-10"	26'-4"
			2	22-2"	22'-6"	22'-10"	23'-4"	23'-10"	21'-10"	22'-4"	22'-10"	23'-4"	23'-10"
			2	19'-8"	20'-0"	20'-4"	20'-10"	21'-4"	19'-4"	19'-10"	20'-4"	20'-10"	21'-4"
			2	17'-2"	17'-6"	17'-10"	18'-4"	18'-10"	16'-10"	17'-4"	17'-10"	18'-4"	18'-10"
			2	14'-8"	15'-0"	15'-4"	15'-10"	16'-4"	14'-4"	14'-10"	15'-4"	15'-10"	16'-4"
			2	12'-2"	12'-6"	12'-10"	13'-4"	13'-10"	11'-10"	12'-4"	12'-10"	13'-4"	13'-10"
			2	9'-8"	10'-0"	10'-4"	10'-10"	11'-4"	9'-4"	9'-10"	10'-4"	10'-10"	11'-4"
			2	7'-2"	7'-6"	7'-10"	8'-4"	8'-10"	—	—	—	—	—
NA	½" ϕ	7" 10" ℓ	10	25'-11"	25'-11"	25'-11"	25'-11"	25'-11"	—	—	—	—	—
			12	—	—	—	—	—	25'-11"	25'-11"	25'-11"	25'-11"	25'-11"
			2	24'-1"	24'-5"	24'-9"	25'-3"	25'-9"	23'-7"	24'-3"	24'-9"	25'-3"	25'-9"
			2	21'-7"	21'-11"	22'-3"	22'-9"	23'-3"	21'-3"	21'-9"	22'-3"	22'-9"	23'-3"
			2	19'-1"	19'-5"	19'-9"	20'-3"	20'-9"	18'-9"	19'-3"	19'-9"	20'-3"	20'-9"
			2	16'-7"	16'-11"	17'-3"	17'-9"	18'-3"	16'-3"	16'-9"	17'-3"	17'-9"	18'-3"
			2	14'-1"	14'-5"	14'-9"	15'-3"	15'-9"	13'-9"	14'-3"	14'-9"	15'-3"	15'-9"
			2	11'-7"	11'-11"	12'-3"	12'-9"	13'-3"	11'-3"	11'-9"	12'-3"	12'-9"	13'-3"
			2	9'-1"	9'-5"	9'-9"	10'-3"	10'-9"	8'-9"	9'-3"	9'-9"	10'-3"	10'-9"
			2	6'-7"	6'-11"	7'-3"	7'-9"	8'-3"	—	—	—	—	—

Tabulation (d) for Girder bridges with Timber deck

Span	B-7601 d	B-1601 d
17'	2'-2⅝"	—
21'	2'-4½"	—
25'	2'-6⅜"	3'-0½"
28'	2'-6⅜"	—
33'	2'-9⅜"	3'-6⅜"
41'	3'-0⅜"	3'-9⅜"
49'	3'-0⅜"	4'-0½"
57'	3'-3⅜"	4'-3⅜"
65'	3'-6⅜"	4'-3⅜"

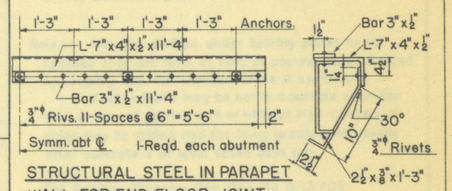
Radius = 3 diam. of bar. Total length of hook at least 16 bar diameters.

TYPICAL HOOK

Note: Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

Specifications
Reinforcing bars - F.S.Q.Q.- B-71
Type B-Grade I (Deformed Structural)
Class A (Open Hearth Steel)

Total approximate weight 15,000.# d = 4'-3⅝"



STRUCTURAL STEEL IN PARAPET WALL FOR END FLOOR JOINT

DETAIL OF ANCHORS.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY
STANDARD WING TYPE ABUTMENT DWG. B-13604
FOR BEAM BRIDGES DWG. B-1601 AND B-7601
H = 18'-0"

DESIGNED W. W. DRAWN A. M.
CHECKED C. C. J. TRACED A. M. C. C. J.
RECOMMENDED FOR APPROVAL E. E. M. DATE Sept. 1935
APPROVED REGIONAL ENGINEER

REVISED DEC. 16-1935.

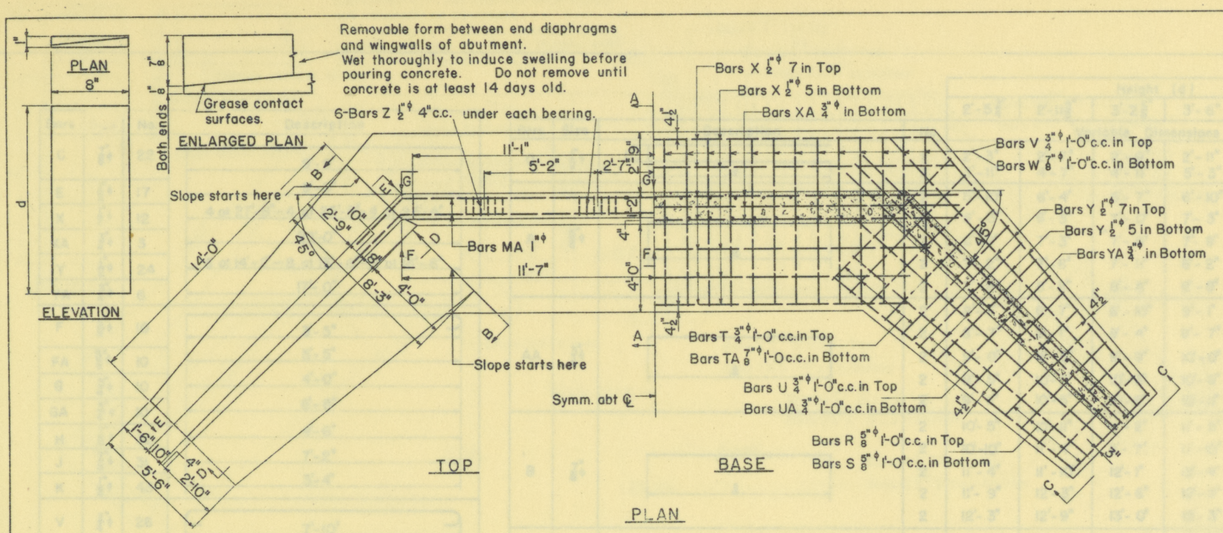
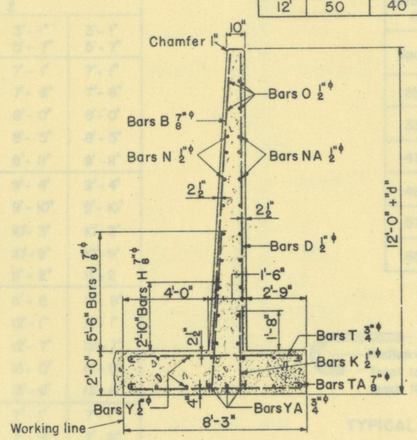
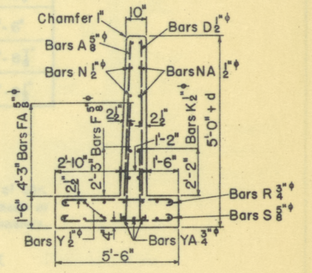
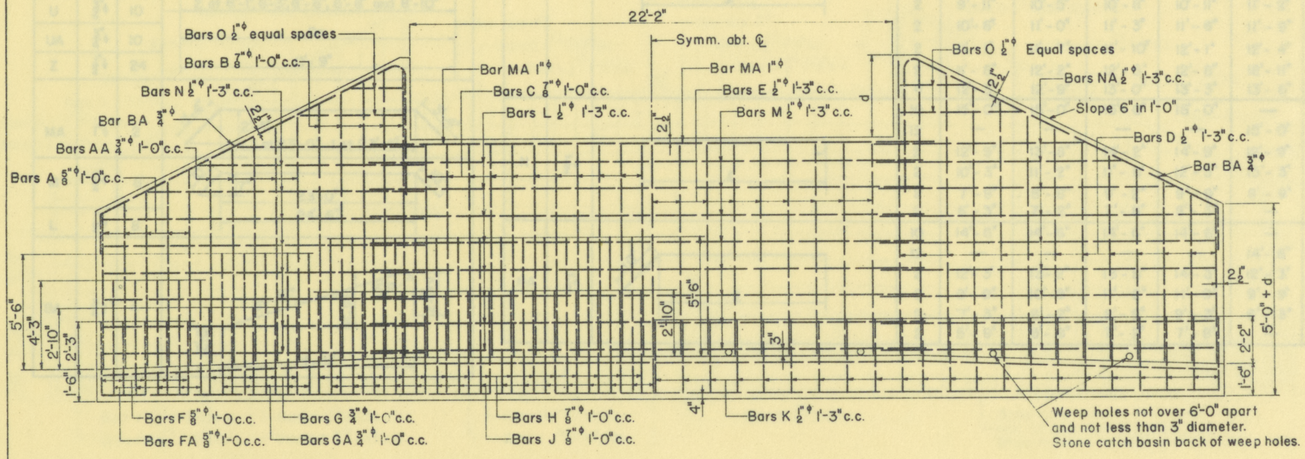


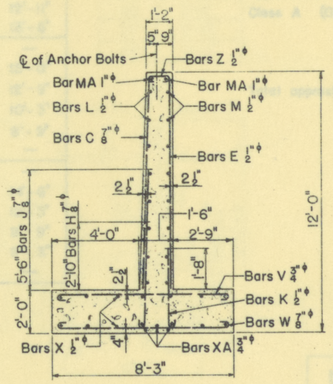
Table of Quantities (Approx.) d = 3'-9⅛"					
Height	Cubic Yards			Bags	Pounds
H	Concrete	Stone	Sand	Cement	Reinfg. Stl.
12'	50	40	25	328	5,900

Tabulation (d) for Girder bridge with Concrete Deck	
Span	B-2201 d
25'	2'-5 3/4"
33'	2'-11 5/8"
41'	3'-2 5/8"
49'	3'-6
57'	3'-8 7/8"
65'	3'-9 1/8"









Specifications
Reinforcing bars - F.S.Q.Q.-B-71
Type B-Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete-Class A 1½-6 Gals. water per bag cement
Chamfer all exposed edges 1".

Design Data
Horizontal Surcharge 300#/sq. ft.
fs = 16,000#/sq. in.
fc = 650#/sq. in. n = 15
This abutment may be founded on impervious clay or well cemented gravel in thick natural beds.

Note:- Masonry surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.
Anchor Bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

For Bending Diagram See Dwg. No. B-13702.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REINFORCED CONCRETE ABUTMENT-WING TYPE
FOR BEAM BRIDGES SHOWN ON DWG. B-2201
HEIGHT-12 FT. ROADWAY-19 FT

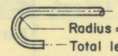
DESIGNED M.W.W. DRAWN A.H.B.
CHECKED E.E.J. TRACED A.H.B.
RECOMMENDED FOR APPROVAL E.E.M. DATE SEPTEMBER 1935.
APPROVED ... REGIONAL ENGINEER

R-7-DRAWING № B-13702

Bars	Size	No.	Description
C	$\frac{7}{8}$"ϕ	22	9'-9"
E	$\frac{1}{2}$"ϕ	17	9'-9"
X	$\frac{1}{2}$"ϕ	12	4 at 27'-8"–4 at 25'-8"–4 at 23'-4"
XA	$\frac{3}{8}$"ϕ	3	28'-0"
Y	$\frac{1}{2}$"ϕ	24	8 at 14'-2"–8 at 15'-6"–8 at 16'-8"
YA	$\frac{3}{4}$"ϕ	6	17'-0"
F	$\frac{5}{8}$"ϕ	10	3'-5"
FA	$\frac{5}{8}$"ϕ	10	5'-5"
G	$\frac{3}{4}$"ϕ	10	4'-0"
GA	$\frac{3}{4}$"ϕ	10	6'-8"
H	$\frac{7}{8}$"ϕ	32	4'-6"
J	$\frac{7}{8}$"ϕ	31	7'-2"
K	$\frac{1}{2}$"ϕ	43	3'-4"
V	$\frac{3}{4}$"ϕ	26	7'-10"
W	$\frac{7}{8}$"ϕ	26	7'-10"
R	$\frac{5}{8}$"ϕ	10	2 at 5'-1", 5'-3", 5'-6", 5'-8" and 5'-10"
S	$\frac{5}{8}$"ϕ	10	Do
T	$\frac{3}{4}$"ϕ	10	2 at 7'-0", 7'-2", 7'-5", 7'-7 and 7'-10"
TA	$\frac{7}{8}$"ϕ	10	Do
U	$\frac{3}{4}$"ϕ	10	2 at 6'-1", 6'-3", 6'-6", 6'-8" and 6'-10"
UA	$\frac{3}{4}$"ϕ	10	Do
Z	$\frac{1}{2}$"ϕ	24	0'-9"
MA	1"ϕ	2	3'-4", 2'-4", 1 at 23'-0", 1 at 23'-4", 3'-4"
M	$\frac{1}{2}$"ϕ	8	10", 7", 23'-0", 24'-6", 10"
L	$\frac{1}{2}$"ϕ	8	
BA	$\frac{3}{4}$"ϕ	4	6", 12", 6"R, 11", 19", 2'-6", 2'-6", 14'-5"

Bars	Size	Description	No.	Height (d) 2'-5 7/4"	2'-11 3/8"	3'-2 5/8"	3'-6"	3'-8 7/8"	3'-9 1/8"
				Variable Dimensions — ℓ					
O	$\frac{1}{2}$"ϕ	5" ℓ	2	2'-3"	2'-7"	2'-9"	2'-11"	3'-1"	3'-1"
			2	3'-11"	4'-7"	4'-11"	5'-3"	5'-7"	5'-7"
A	$\frac{5}{8}$"ϕ	ℓ	2	5'-10"	6'-4"	6'-7"	6'-10"	7'-1"	7'-1"
			2	6'-3"	6'-5"	7'-0"	7'-3"	7'-6"	7'-6"
			2	6'-9"	7'-3"	7'-6"	7'-9"	8'-0"	8'-0"
			2	7'-2"	7'-8"	7'-11"	8'-2"	8'-5"	8'-5"
			2	7'-8"	8'-2"	8'-5"	8'-8"	8'-11"	8'-11"
AA	$\frac{3}{4}$"ϕ	ℓ	2	8'-1"	8'-7"	8'-10"	9'-1"	9'-4"	9'-4"
			2	8'-7"	9'-1"	9'-4"	9'-7"	9'-10"	9'-10"
			2	9'-0"	9'-6"	9'-9"	10'-0"	10'-3"	10'-3"
			2	9'-6"	10'-0"	10'-3"	10'-6"	10'-9"	10'-9"
			2	9'-11"	10'-5"	10'-8"	10'-11"	11'-2"	11'-2
B	$\frac{7}{8}$"ϕ	ℓ	2	10'-5"	10'-11"	11'-2"	11'-5"	11'-8	11'-8"
			2	10'-10"	11'-4"	11'-7"	11'-10"	12'-1"	12'-1"
			2	11'-4"	11'-10"	12'-1"	12'-4"	12'-7"	12'-7"
			2	11'-9"	12-3"	12'-6"	12'-9"	13'-0"	13'-0"
			2	12'-3"	12'-9"	13'-0"	13'-3"	13'-6"	13'-6"
D	$\frac{1}{2}$"ϕ	ℓ	2	5'-10"	6'-4"	6'-7"	6'-10"	7'-1"	7'-1"
			2	6'-5"	6'-11"	7'-2"	7'-5"	7'-8"	7'-8"
			2	7'-0"	7'-6"	7'-9"	8'-0"	8'-3"	8'-3"
			2	7'-7"	8'-1"	8'-4"	8'-7"	8'-10"	8'-10"
			2	8'-2"	8'-8"	8'-11"	9'-2"	9'-5"	9'-5"
			2	8'-9"	9'-3"	9'-6"	9'-9"	10'-0"	10'-0"
			2	9'-4"	9'-10"	10'-1"	10'-4"	10'-7"	10'-7"
			2	9'-11"	10'-5"	10'-8"	10'-11"	11'-2"	11'-2"
			2	10'-6"	11'-0"	11'-3"	11'-6"	11'-9"	11'-9"
			2	11'-1"	11'-7"	11'-10"	12'-1"	12'-4"	12'-4"
			2	11'-8"	12'-2"	12'-5"	12'-8"	12'-11"	12'-11"
			4	12'-3"	12'-9"	13'-0"	13'-3"	13'-6"	13'-6"
N	$\frac{1}{2}$"ϕ	ℓ	10	15'-0"	15'-0"	15'-0"	15'-0"	—	—
			12	—	—	—	—	15'-0"	15'-0"
			2	12'-9"	13'-8"	14'-2"	14'-9"	12'-9"	12'-9"
			2	10'-3"	11'-2"	11'-8"	12'-3"	15'-3"	10'-3"
			2	7'-9"	8'-8"	9'-2"	9'-9"	8'-9"	8'-9"
			2	6'-3"	7'-2"	7'-8"	8'-3"	—	—
NA	$\frac{1}{2}$"ϕ	10" ℓ	10	14'-6"	14'-6"	14'-6"	14'-6"	—	—
			12	—	—	—	—	14'-6"	14'-6"
			2	12'-3"	13'-2"	13'-8"	14'-3"	12'-3"	12'-3"
			2	9'-9"	10'-8"	11'-2"	11'-9"	9'-9"	9'-9"
			2	7'-3"	8'-2"	8'-8"	9'-3"	8'-3"	8'-3"
			2	5'-9"	6'-8"	7'-2"	7'-9"	—	—

Tabulation (d) for Girder bridge with Concrete Deck	
Span	B-2201
25'	2'-5 3/4"
33'	2'-11 3/8"
41'	3'-2 5/8"
49'	3'-6"
57'	3'-8 7/8"
65'	3'-9 1/8"



Radius = 3 diam. of bar.
Total length of hook at least 16 bar diameters.

TYPICAL HOOK

Note: Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

Specifications
Reinforcing bars — F.S.Q.Q.–B-71
Type B-Grade-I (Deformed Structural)
Class A (Open Hearth Steel)

Total approximate weight 5900# d= 3'-9"

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. B-13701
FOR BEAM BRIDGE DWG. B-2201
HEIGHT 12'-0"

DESIGNED M.W.W. DRAWN A.M.
CHECKED A.M. TRACED A.M. M.W.W.
RECOMMENDED FOR APPROVAL E.E.M. DATE Sept. 1935
APPROVED REGIONAL ENGINEER

R-7-DRAWING Nº B-13703

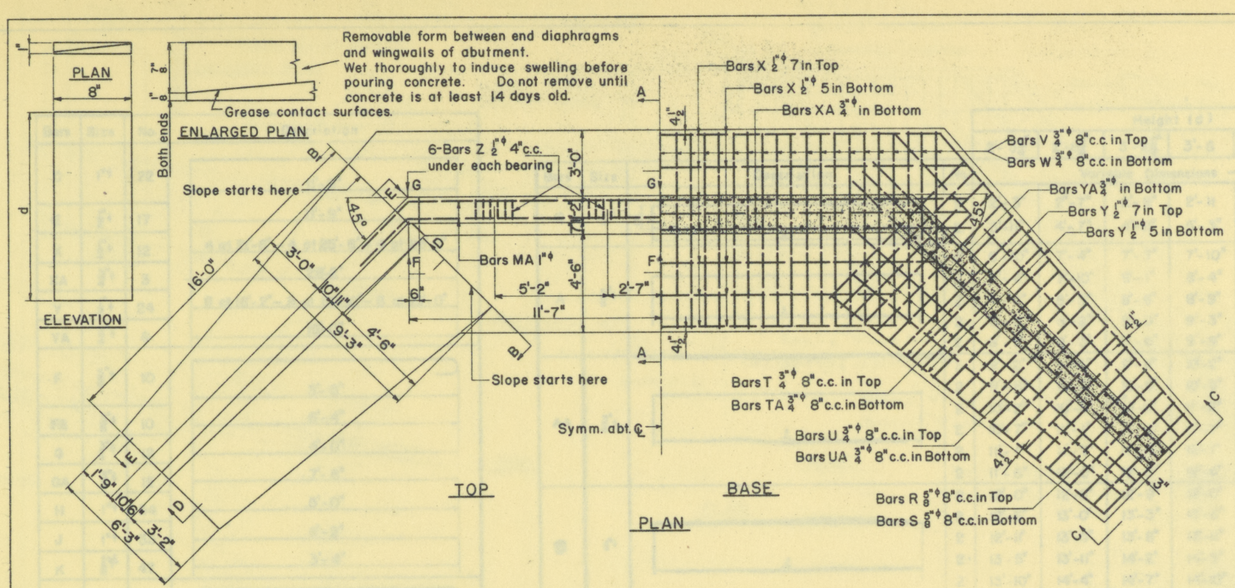
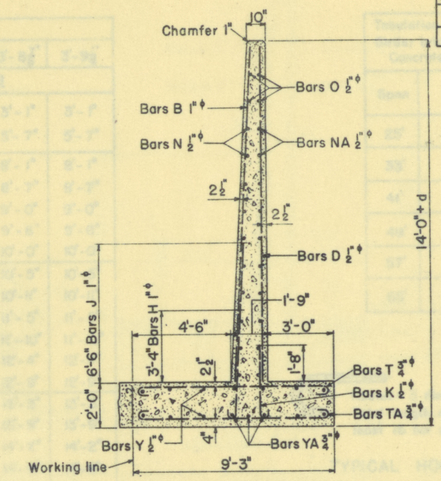
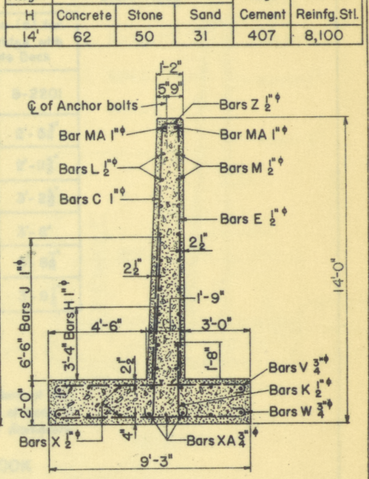


Table of Quantities (Approx) d = 3'-9⅛"					
Height	Cubic Yards			Bags	Pounds
H	Concrete	Stone	Sand	Cement	Reinfg. Stl.
14'	62	50	31	407	8,100





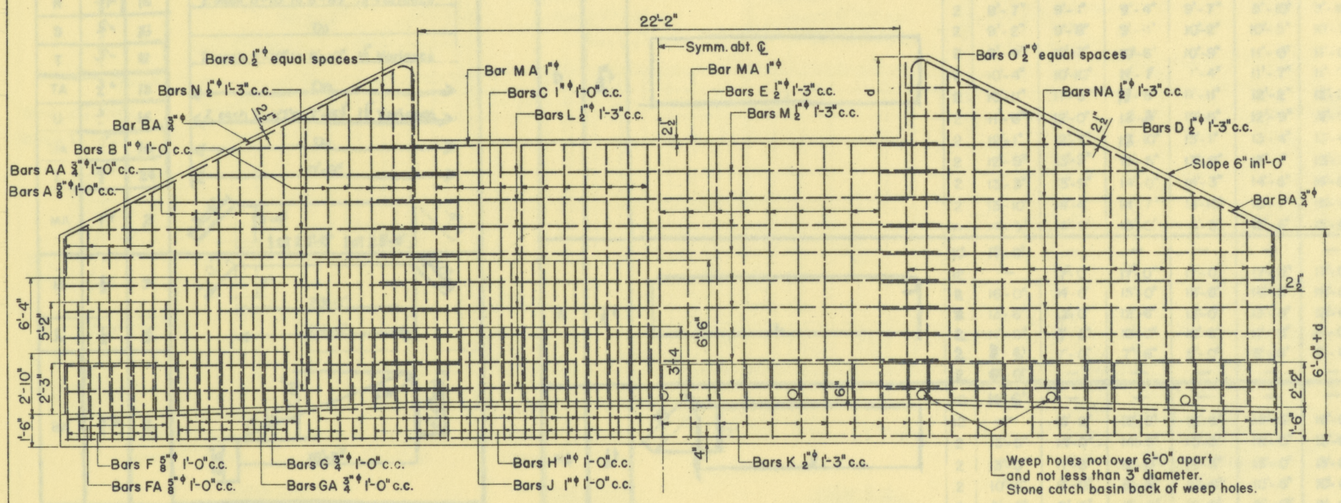
Tabulation (d) for Girder bridge with Concrete Deck	
Span	B-2201 d
25'	2'-5¾"
33'	2'-11⅞"
41'	3'-2⅝"
49'	3'-6"
57'	3'-8⅛"
65'	3'-9⅛"

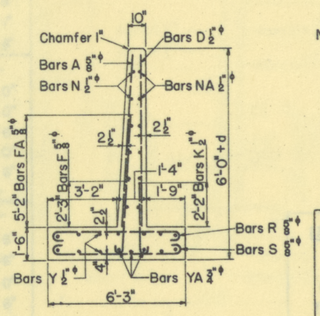
Specifications
Reinforcing bars - F. S. Q. Q. - B-71
Type B - Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete - Class A 1½ - 6 Gals. water per bag cement.
Chamfer all exposed edges 1".

Design Data
Horizontal Surcharge 300 #/sq. ft.
fs = 16,000 #/sq. in.
fc = 650 #/sq. in. n = 15
This abutment may be founded on impervious clay or well cemented gravel in thick natural beds.

Note :- Masonry surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.
Anchor Bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

For Bending Diagram See Dwg. No. B-13704.





U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REINFORCED CONCRETE ABUTMENT-WING TYPE
FOR BEAM BRIDGES SHOWN ON DWG. B-2201
HEIGHT-14 FT. ROADWAY-19 FT.

DESIGNED W. W.
CHECKED C. E. K.
RECOMMENDED FOR APPROVAL C. E. Mc.
DRAWN A.H.B.
TRACED A.H.B. C.C.J.
DATE SEPTEMBER 1935
APPROVED Johnson REGIONAL ENGINEER

Bars	Size	No.	Description
C	1"	22	11'-9"
E	1"	17	11'-9"
X	1"	12	4 at 21'-6" – 4 at 25'-8" – 4 at 28'-2"
XA	3/4"	3	28'-2"
Y	1"	24	8 at 16'-2" – 8 at 17'-10" – 8 at 19'-0"
YA	3/4"	6	19'-0"
F	5/8"	10	3'-5"
FA	5/8"	10	6'-4"
G	3/4"	12	4'-0"
GA	3/4"	12	7'-6"
H	1"	34	5'-0"
J	1"	33	8'-2"
K	1/2"	47	3'-4"
V	3/4"	39	8'-10"
W	3/4"	39	8'-10"
R	5/8"	16	2 each 5'-10" to 6'-8 1/2" 1" Variance
S	5/8"	16	Do
T	3/4"	16	2 each 7'-10" to 8'-10" 1" Variance
TA	3/4"	13	Do
U	3/4"	16	2 each 6'-10" to 7'-8 1/2" 1" Variance
UA	3/4"	16	Do
Z	1/2"	24	2'-9"
MA	1"	2	1 at 23'-0" 1 at 23'-4"
M	1/2"	9	23'-0"
L	1/2"	9	24'-6"
BA	3/4"	4	16'-5"

Bars	Size	Description	No.	Height (d) 2'-5 3/4"	2'-11 5/8"	3'-2 5/8"	3'-6	3'-8 7/8"	3'-9 1/8"
				Variable Dimensions — l					
O	1/2"		2	2'-3"	2'-7"	2'-9"	2'-11	3'-1"	3'-1"
			2	3'-11"	4'-7"	4'-11"	5'-3"	5'-7"	5'-7"
A	5/8"		2	6'-10"	7'-4"	7'-7"	7'-10"	8'-1"	8'-1"
			2	7'-4"	7'-10"	8'-1"	8'-4"	8'-7"	8'-7"
			2	7'-9"	8'-3"	8'-6"	8'-9"	9'-0"	9'-0"
			2	8'-3"	8'-9"	9'-0"	9'-3"	9'-6"	9'-6"
			2	8'-9"	9'-3"	9'-6"	9'-9"	10'-0"	10'-0"
AA	3/4"		2	9'-2"	9'-8"	9'-11"	10'-2"	10'-5"	10'-5"
			2	9'-8"	10'-2"	10'-5"	10'-8"	10'-11"	10'-11"
			2	10'-2"	10'-8"	10'-11"	11'-2"	11'-5"	11'-5"
			2	10'-7"	11'-1"	11'-4"	11'-7"	11'-10"	11'-10"
			2	11'-1"	11'-7"	11'-10"	12'-1"	12'-4"	12'-4"
			2	11'-6"	12'-0"	12'-3"	12'-6"	12'-9"	12'-9"
B	1"		2	12'-0"	12'-6"	12'-9"	13'-0"	13'-3"	13'-3"
			2	12'-6"	13'-0"	13'-3"	13'-6"	13'-9"	13'-9"
			2	12'-11"	13'-5"	13'-8"	13'-11"	14'-2"	14'-2"
			2	13'-5"	13'-11"	14'-2"	14'-5"	14'-8"	14'-8"
			2	13'-10"	14'-4"	14'-7"	14'-10"	15'-1"	15'-1"
			2	14'-3"	14'-9"	15'-0"	15'-3"	15'-6"	15'-6"
D	1 1/2"		2	6'-10"	7'-4"	7'-7"	7'-10"	8'-1"	8'-1"
			2	7'-5"	7'-11"	8'-2"	8'-5"	8'-8"	8'-8"
			2	8'-0"	8'-6"	8'-9"	9'-0"	9'-3"	9'-3"
			2	8'-7"	9'-1"	9'-4"	9'-7"	9'-10"	9'-10"
			2	9'-2"	9'-8"	9'-11"	10'-2"	10'-5"	10'-5"
			2	9'-9"	10'-3"	10'-6"	10'-9"	11'-0"	11'-0"
			2	10'-4"	10'-10"	11'-1"	11'-4"	11'-7"	11'-7"
			2	10'-11"	11'-5"	11'-8"	11'-11"	12'-2"	12'-2"
			2	11'-6"	12'-0"	12'-3"	12'-6"	12'-9"	12'-9"
			2	12'-1"	12'-7"	12'-10"	13'-1"	13'-4"	13'-4"
			2	12'-8"	13'-2"	13'-5"	13'-8"	13'-11"	13'-11"
			2	13'-3"	13'-9"	14'-0"	14'-3"	14'-6"	14'-6"
			2	13'-10"	14'-4"	14'-7"	14'-10"	15'-1"	15'-1"
			2	14'-3"	14'-9"	15'-0"	15'-3"	15'-6"	15'-6"
N	1 1/2"		10	17'-0"	—	—	—	—	—
			12	—	17'-0"	17'-0"	17'-0"	17'-0"	17'-0"
			2	16'-0"	14'-6"	15'-0"	15'-6"	16'-0"	16'-0"
			2	13'-6"	12'-0"	12'-6"	13'-0"	13'-6"	13'-6"
			2	11'-0"	9'-6"	10'-0"	10'-6"	11'-0"	11'-0"
			2	8'-6"	7'-0"	7'-6"	8'-0"	8'-6"	8'-6"
			2	6'-0"	—	—	—	—	—
NA	1 1/2"		10	16'-6"	—	—	—	—	—
			12	—	16'-6"	16'-6"	16'-6"	16'-6"	16'-6"
			2	15'-6"	14'-0"	14'-6"	15'-0"	15'-6"	15'-6"
			2	13'-0"	11'-6"	12'-0"	12'-6"	13'-0"	13'-0"
			2	10'-6"	9'-0"	9'-6"	10'-0"	10'-6"	10'-6"
			2	8'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-0"
			2	5'-6"	—	—	—	—	—

Tabulation (d) for Girder bridge with Concrete Deck	
Span	B-2201
25'	2'-5 3/4"
33'	2'-11 5/8"
41'	3'-2 5/8"
49'	3'-6"
57'	3'-8 7/8"
65'	3'-9 1/8"

Radius = 3 diam. of bar.
Total length of hook at least 16 bar diameters.

TYPICAL HOOK

Note Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

Specifications
Reinforcing bars — F.S.Q.Q.— B-71
Type B-Grade-1 (Deformed Structural)
Class A (Open Hearth Steel)

Total approximate weight 8100# d= 3'-9"

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. B-13703
FOR BEAM BRIDGE DWG. B-2201
HEIGHT 14'-0"

DESIGNED O.W.W. DRAWN A.M.
CHECKED A.M. TRACED A.M.
RECOMMENDED FOR APPROVAL E&M
DATE Sept. 1935
APPROVED REGIONAL ENGINEER

R-7-DRAWING Nº B-13705

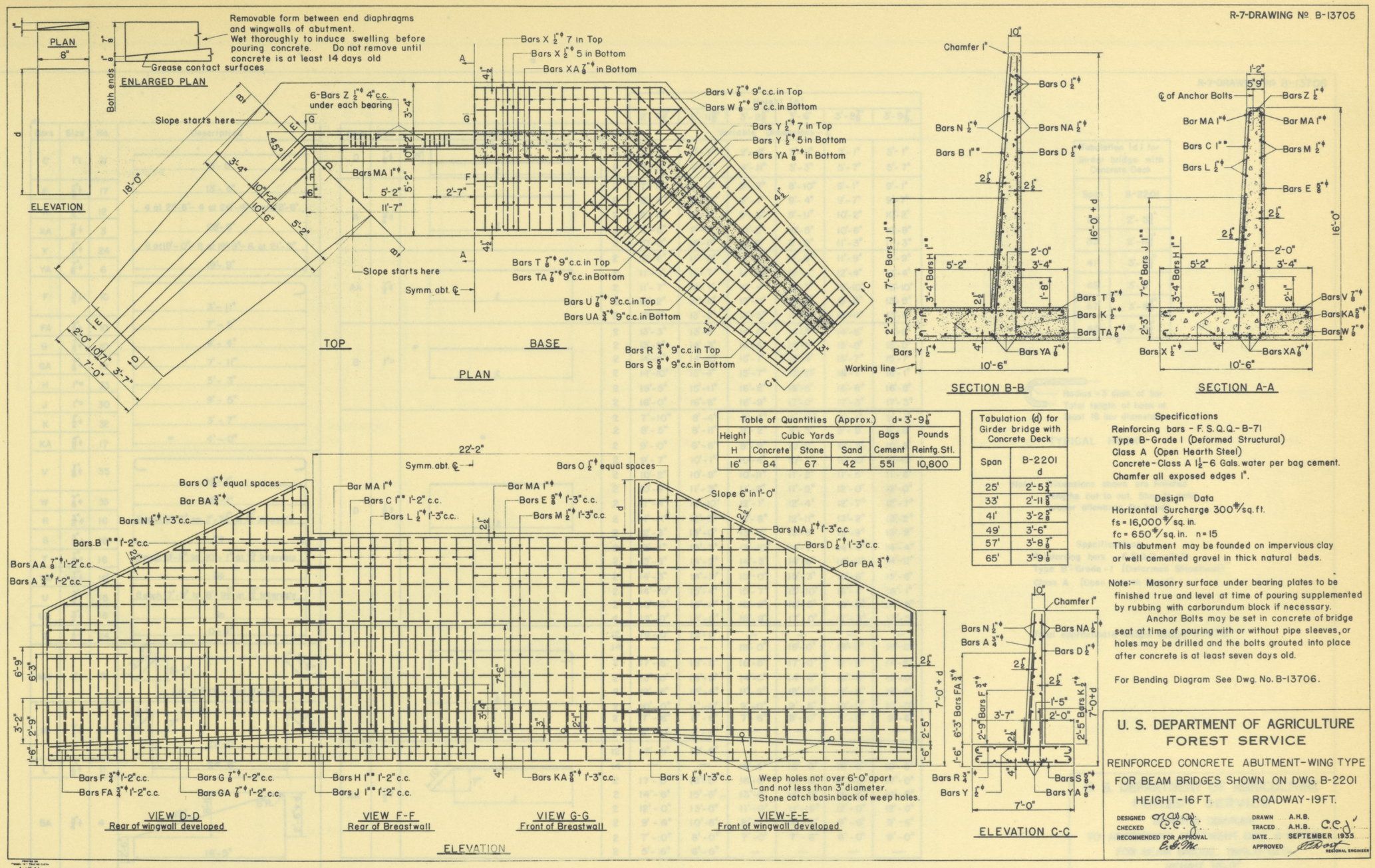


Table of Quantities (Approx) d = 3'-9 1/8"					
Height	Cubic Yards			Bags	Pounds
H	Concrete	Stone	Sand	Cement	Reinfg. Stl.
16'	84	67	42	551	10,800

Tabulation (d) for Girder bridge with Concrete Deck	
Span	B-2201 d
25'	2'-5 3/4"
33'	2'-11 5/8"
41'	3'-2 5/8"
49'	3'-6"
57'	3'-8 3/8"
65'	3'-9 1/8"

Specifications
Reinforcing bars - F. S. Q. Q. - B-71
Type B-Grade I (Deformed Structural)
Class A (Open Hearth Steel)
Concrete - Class A 1 1/2 - 6 Gals. water per bag cement.
Chamfer all exposed edges 1".

Design Data
Horizontal Surcharge 300#/sq. ft.
fs = 16,000#/sq. in.
fc = 650#/sq. in. n = 15
This abutment may be founded on impervious clay or well cemented gravel in thick natural beds.

Note:- Masonry surface under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.
Anchor Bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

For Bending Diagram See Dwg. No. B-13706.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REINFORCED CONCRETE ABUTMENT - WING TYPE
FOR BEAM BRIDGES SHOWN ON DWG. B-2201
HEIGHT - 16 FT. ROADWAY - 19 FT.

DESIGNED C.E.J.
CHECKED C.E.J.
RECOMMENDED FOR APPROVAL E. G. M.
DRAWN A.H.B.
TRACED A.H.B.
DATE SEPTEMBER 1935
APPROVED REGIONAL ENGINEER

Bars	Size	No.	Description
C	1" ϕ	21	13'-6"
E	5/8" ϕ	17	13'-6"
X	1/2" ϕ	12	4 at 21'-6" – 4 at 26'-4" – 4 at 28'-6"
XA	7/8" ϕ	3	28'-6"
Y	1/2" ϕ	24	8 at 18'-0" – 8 at 19'-9" – 8 at 21'-3"
YA	7/8" ϕ	6	19'-9"
F	3/4" ϕ	10	3'-11"
FA	3/4" ϕ	10	7'-5"
G	7/8" ϕ	10	4'-4"
GA	7/8" ϕ	10	7'-11"
H	1" □	33	5'-3"
J	1" □	30	9'-5"
K	1/2" ϕ	32	3'-7"
KA	5/8" ϕ	17	4'-0"
V	7/8" ϕ	35	10'-1"
W	7/8" ϕ	35	10'-1"
R	3/4" ϕ	16	2 each 6'-7" to 7'-7 1/4" at 1'-8" Intervals
S	5/8" ϕ	16	Do
T	7/8" ϕ	18	2 each 8'-11" to 10'-1" at 1'-8" Intervals
TA	7/8" ϕ	18	Do
U	7/8" ϕ	16	2 each 7'-9" to 8'-9 1/2" at 1'-8" Intervals
UA	3/4" ϕ	16	Do
Z	1/2" ϕ	24	0'-9"
MA	1" ϕ	2	3'-4", 2'-4", 3'-4", 1 at 23'-0" – 1 at 23'-4"
M	1/2" ϕ	11	10", 7", 10", 23'-0"
L	1/2" ϕ	11	24'-6"
BA	3/4" ϕ	4	6", 12", 8-11", 6" R., 2'-6" + d, 2'-6", 18'-5"

Bars	Size	Description	No.	Height (d) 2'-5 3/4"	2'-11 5/8"	3'-2 5/8"	3'-6"	3'-8 7/8"	3'-9 1/8"
				Variable Dimensions – ℓ					
O	1/2" ϕ	6"	2	2'-3"	2'-7"	2'-9"	2'-11"	3'-1"	3'-1"
		ℓ	2	3'-11"	4'-7"	4'-11"	5'-3"	5'-7"	5'-7"
A	3/4" ϕ	ℓ	2	7'-10"	8'-4"	8'-7"	8'-10"	9'-1"	9'-1"
			2	8'-4"	8'-10"	9'-1"	9'-4"	9'-7"	9'-7"
			2	8'-11"	9'-5"	9'-8"	9'-11"	10'-2"	10'-2"
			2	9'-5"	9'-11"	10'-2"	10'-5"	10'-8"	10'-8"
			2	10'-0"	10'-6"	10"-9"	11'-0"	11'-3"	11'-3"
AA	7/8" ϕ	ℓ	2	10'-6"	11'-0"	11'-3"	11'-6"	11'-9"	11'-9"
			2	11'-1"	11'-7"	11'-10"	12'-1"	12'-4"	12'-4"
			2	11'-7"	12'-1"	12'-4"	12'-7"	12'-10"	12'-10"
			2	12'-2"	12'-8"	12'-11"	13'-2"	13'-5"	13'-5"
			2	12'-8"	13'-2"	13'-5"	13'-8"	13'-11"	13'-11"
B	1" □	ℓ	2	13'-3"	13'-9"	14'-0"	14'-3"	14'-6"	14'-6"
			2	13'-9"	14'-3"	14'-6"	14'-9"	15'-0"	15'-0"
			2	14'-4"	14'-10"	15'-1"	15'-4"	15'-7"	15'-7"
			2	14'-10"	15'-4"	15'-7"	15'-10"	16'-1"	16'-1"
			2	15'-5"	15'-11"	16'-2"	16'-5"	16'-8"	16'-8"
			2	16'-0"	16'-6"	16'-9"	17'-0"	17'-3"	17'-3"
D	1/2" ϕ	ℓ	2	7'-10"	8'-4"	8'-7"	8'-10"	9'-1"	9'-1"
			2	8'-5"	8'-11"	9'-2"	9'-5"	9'-8"	9'-8"
			2	9'-0"	9'-6"	9'-9"	10'-0"	10'-3"	10'-3"
			2	9'-7"	10'-1"	10'-4"	10'-7"	10'-10"	10'-10"
			2	10'-2"	10'-8"	10'-11"	11'-2"	11'-5"	11'-5"
			2	10'-9"	11'-3"	11'-6"	11'-9"	12'-0"	12'-0"
			2	11'-4"	11'-10"	12'-1"	12'-4"	12'-7"	12'-7"
			2	11'-11"	12'-5"	12'-8"	12'-11"	13'-2"	13'-2"
			2	12'-6"	13'-0"	13'-3"	13'-6"	13'-9"	13'-9"
			2	13'-1"	13'-7"	13'-10"	14'-1"	14'-4"	14'-4"
			2	13'-8"	14'-2"	14'-5"	14'-8"	14'-11"	14'-11"
			2	14'-3"	14'-9"	15'-0"	15'-3"	15'-6"	15'-6"
			2	14'-10"	15'-4"	15'-7"	15'-10"	16'-1"	16'-1"
			2	15'-5"	15'-11"	16'-2"	16'-5"	16'-8"	16'-8"
			4	16'-0"	16'-6"	16'-9"	17'-0"	17'-3"	17'-3"
N	1/2" ϕ	ℓ	12	19'-0"	19'-0"	—	—	—	—
			14	—	—	19'-0"	19'-0"	19'-0"	19'-0"
			2	17'-6"	18'-6"	16'-6"	17'-0"	17'-6"	17'-6"
			2	15'-0"	16'-0"	14'-0"	14'-6"	15'-0"	15'-0"
			2	12'-6"	13'-6"	11'-6"	12'-0"	12'-6"	12'-6"
			2	10'-0"	11'-0"	9'-0"	9'-6"	10'-0"	10'-0"
			2	7'-6"	8'-6"	7'-6"	8'-0"	8'-6"	8'-6"
			2	6'-0"	7'-0"	—	—	—	—
NA	1/2" ϕ	10", 7", ℓ	12	18'-6"	18'-6"	—	—	—	—
			14	—	—	18'-6"	18'-6"	18'-6"	18'-6"
			2	17'-0"	18'-0"	16'-0"	16'-6"	17'-0"	17'-0"
			2	14'-6"	15'-6"	13'-6"	14'-0"	14'-6"	14'-0"
			2	12'-0"	13'-0"	11'-0"	11'-6"	12'-0"	12'-0"
			2	9'-6"	10'-6"	8'-6"	9'-0"	9'-6"	9'-6"
			2	7'-0"	8'-0"	7'-0"	7'-6"	8'-0"	8'-0"
			2	5'-6"	6'-6"	—	—	—	—

Tabulation (d) for Girder bridge with Concrete Deck	
Span	B-2201
25'	2'-5 3/4"
33'	2'-11 5/8"
41'	3'-2 5/8"
49'	3'-6"
57'	3'-8 7/8"
65'	3'-9 1/8"

Radius = 3 diam. of bar.
Total length of hook at least 16 bar diameters.

TYPICAL HOOK

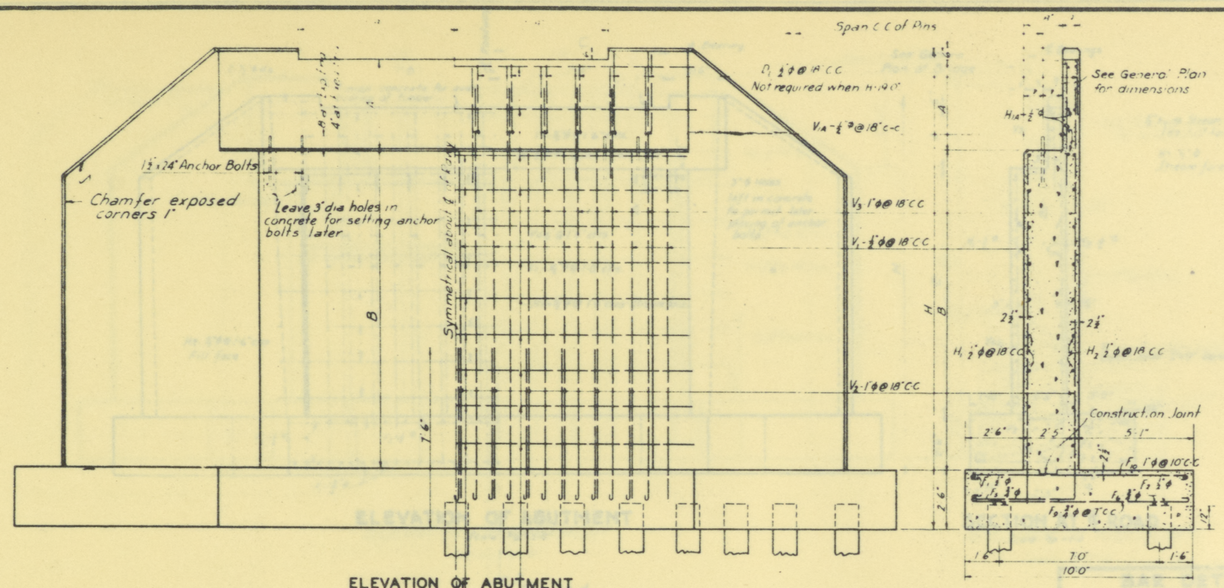
Note: Dimensions shown are finished lengths out to out. Shop to make proper allowance for bends.

Specifications
Reinforcing bars – F.S.Q.Q. – B-71
Type B - Grade - I (Deformed Structural)
Class A (Open Hearth Steel)

Total approximate weight 10800# d = 3'-9"

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
TO ACCOMPANY ABUTMENT DWG. B-13705
FOR BEAM BRIDGE. DWG. B-2201
HEIGHT 16'-0"

DESIGNED M. M. M. DRAWN A.M.
CHECKED A.M. TRACED A.M.
RECOMMENDED FOR APPROVAL E. & M.
DATE Sept. 1935
APPROVED REGIONAL ENGINEER

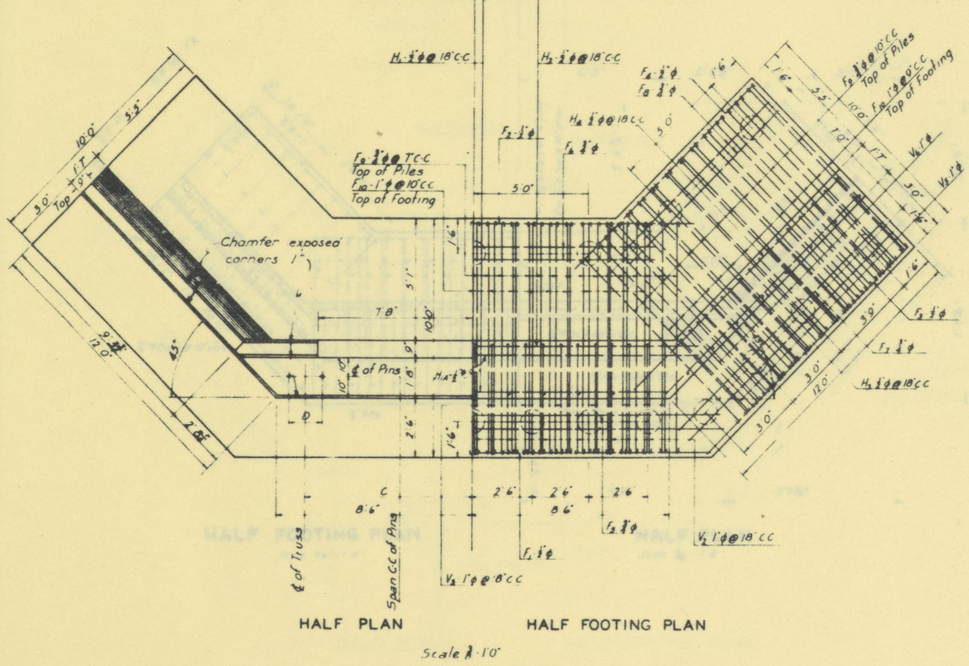


ELEVATION OF ABUTMENT
Scale ⅜"-1'0"

SECTION OF ABUTMENT
Scale ⅜"-1'0"

ELEVATION OF WING
Scale ⅜"-1'0"

WING SECTION
Scale ⅜"-1'0"



HALF PLAN HALF FOOTING PLAN
Scale ¼"-1'0"

ROD DETAILS
Rods are listed for 2 abutments. H=20'-0"

Mark	Location	Size	Total Length	No	Sketch
F_1	Main Footing	½ ϕ	20'-6"	4	
F_2	" "	"	19'-0"	2	"
F_3	Wing "	"	12'-3"	8	"
F_4	" "	"	11'-0"	4	"
F_5	Main "	⅝ ϕ	22'-0"	4	"
F_6	" "	"	16'-0"	4	"
F_7	Wing "	"	12'-6"	8	"
F_8	" "	"	9'-0"	8	"
F_9	Footings	"	11'-3"	114	2'-3"
F_{10}	"	1" ϕ	11'-10"	98	2'-8"
V_1	Main Wall	½ ϕ	4'-3"	26	
V_2	" "	1" ϕ	12'-1½"	22	6'-6" 4'-3"
V_3	" "	"	23'-8½"	24	18'-1" 4'-3"
V_5	Wing "	"	11'-9½"	32	6'-6" 3'-11"
V_6A	" "	"	18'-9½"	8	13'-6"
V_6B	" "	"	20'-6½"	8	15'-3"
V_6C	" "	"	21'-10½"	8	16'-7"
V_6D	" "	"	23'-0½"	8	17'-9"
V_6E	" "	"	23'-11½"	4	18'-5" 3'-11"
V_4A	" "	½ ϕ	3'-6"	8	
V_4B	" "	"	15'-3"	8	"
V_4C	" "	"	16'-10"	8	"
V_4D	" "	"	18'-7"	4	"
W_1	" "	"	13'-6"	8	Field Bend
H_1	Main Walls	"	17'-0"	18	
H_2	" "	"	20'-6"	22	"
H_3	Wing "	"	11'-9"	32	"
H_3A	" "	"	9'-9"	4	"
H_3B	" "	"	6'-0"	4	"
H_4	" "	"	12'-9"	32	"
H_4A	" "	"	10'-6"	4	"
H_4B	" "	"	7'-0"	4	"
H_{1A}	Main Wall	"	20'-0"	6	"
D_1	Back - (H-21)	"	4'-0"	24	"
V_{1A}	Main Wall	"	5'-0"	24	"

Size	D	L
½"	2½"	8"
⅝"	3"	10"
¾"	3½"	12"
⅞"	4½"	14"
1"	5"	16"

Length as shown in sketches

ROD HOOKS & BENDS

QUANTITIES FOR ONE ABUT & WINGS

H	Class A Concrete Cu Yds	Reinf. Steel Lbs	Gravel Cu Yds	Sand Cu Yds	Cement Sacks	Lumber 2"x6" Rough	Lumber 1"x8" Shiplap	Wire #9 Soft	Nails 6d	Nails 10d	Nails 50#
19'	70.0	6167	62.3	30.8	408	135pc 10'	143pc 16'	200#	100#	50#	50#
20'	72.5	63 62	64.5	31.9	422	165pc 12'	151pc 16'	200#	100#	50#	50#
21'	75.6	6547	68.1	33.3	441	174pc 12'	160pc 16'	200#	100#	50#	50#

DIMENSIONS
A 3'9½" for 100 Truss-12' Rdwy
" 3'9½" " 120" " " "
" 3'10½" " 140" " " "
" 3'9½" " 150" " " "
B = H-(A+3'0")
C = 1'3" for 100 Truss-12' Rdwy
" 1'3" " 120" " " "
" 1'4½" " 140" " " "
" 1'3" " 150" " " "
D = 1'5" " 100" " " "
" 1'5" " 120" " " "
" 1'7½" " 140" " " "
" 1'5½" " 150" " " "

Note:
All concrete to be Class "B", 1:2:4 mix.
Chamfer all exposed corners 1".
All rod dimensions shown are to centers of rods.

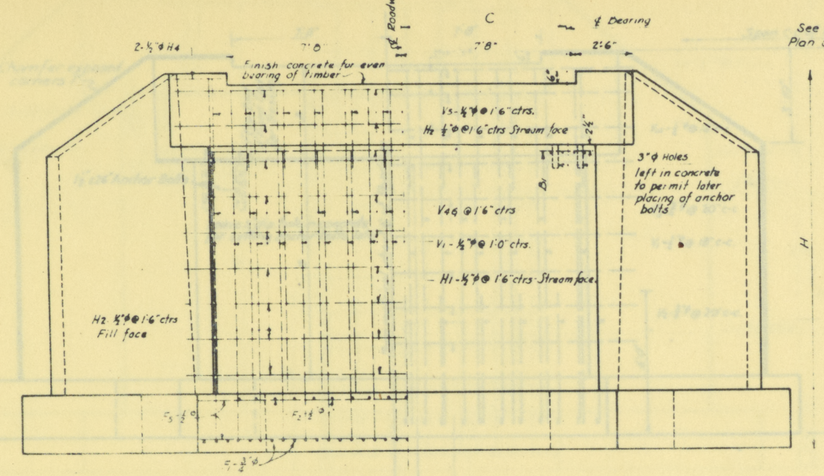
Note: For H=19' or 21' decrease or increase lengths of all vertical bars accordingly.

DESIGNED A.L.K.
CHECKED
TRACED
APPROVED
7/15, 34 Regional Engineer

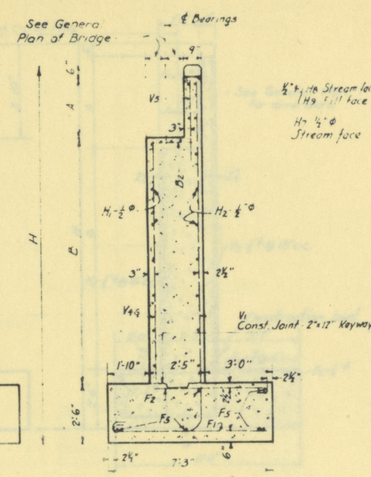
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE ABUTMENTS WITH PILES HEIGHTS 19' TO 21' STEEL TRUSS BRIDGE
12 FOOT ROADWAY

APRIL 1934 SHEET 1 OF 1

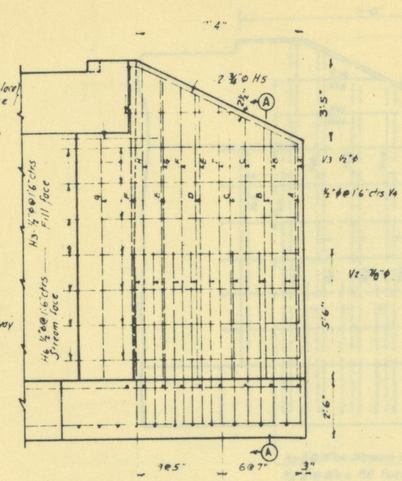
DR. NO. 21



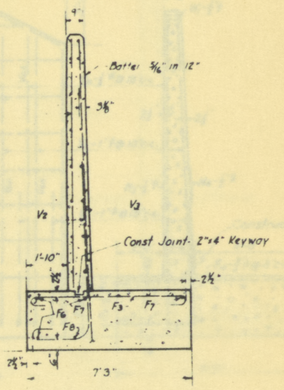
ELEVATION OF ABUTMENT
Scale 3/8"=1'0"



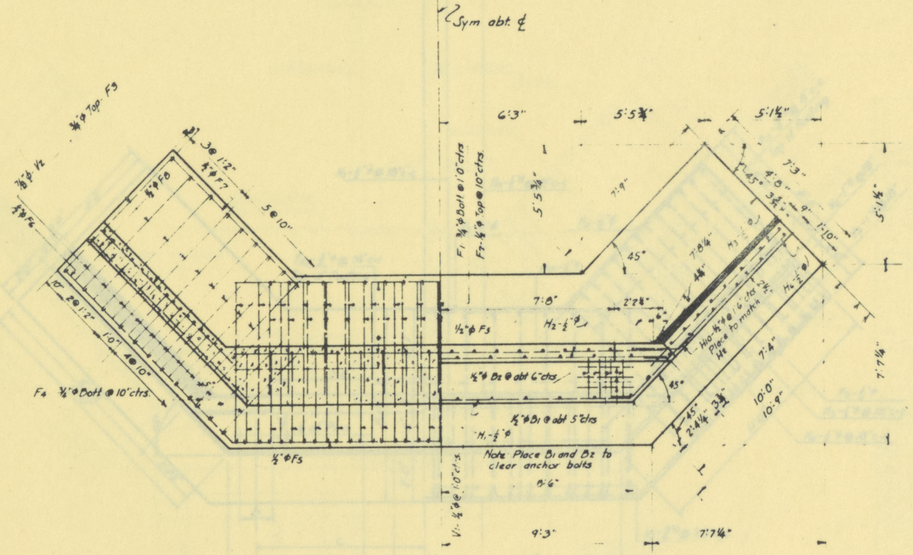
SECTION AT ℄ ROAD
Scale 3/4"=1'0"



ELEVATION OF WING
Scale 3/8"=1'0"



SECTION A-A
Scale 3/4"=1'0"



HALF FOOTING PLAN
Scale 3/8"=1'0"

HALF PLAN
Scale 3/8"=1'0

BAR DETAILS (H=16'0")
(Listed for 2 abutments)

Mark	Location	Size	Total Length	No. Bars	A	Sketch
F1	Main Footing	¾"ϕ	7'7"	38	6'7"	
F2	" "	½"ϕ	5'8"	38	5'0	
F3	Wing "	¾"ϕ	8'5"	36	6'3	
F4	" "	¾"ϕ	5'6"	12	4'6"	
F5	Main "	½"ϕ	18'4"	10		Straight
F6	Wing "	"	10'5	8		"
F7	" "	"	8'0"	8		"
F8	" "	"	10'0"	4		"
V1	Main Wall	½"ϕ	19'2	36	3'8½	4'10"
V2	Wing "	½"ϕ	10'1"	32	2'2½	7'6"
V3A	" "	½"ϕ	12'0"	4		Straight
V3B	" "	"	12'6"	"		"
V3C	" "	"	13'1"	"		"
V3D	" "	"	13'7"	"		"
V3E	" "	"	14'0"	"		"
V3F	" "	"	14'4"	"		"
V3G	" "	"	14'9"	"		"
V3H	" "	"	15'2"	"		"
V4A	" "	"	10'0"	"		"
V4B	" "	"	10'8	"		"
V4C	" "	"	11'5"	"		"
V4D	" "	"	12'1"	"		"
V4E	" "	"	12'9"	"		"
V4F	" "	"	13'4"	"		"
V4G	Main and Wing walls	"	B-27	28		"
V5	Main Wall	"	4'x(10')	24		"
H1	" "	"	16'10"	14		"
H2	" "	"	20'0"	22		"
H3	Wing "	"	8'3"	26		"
H4	Main "	"	3'0"	8		
H5	Wing Wall	¾"ϕ	9'3"	8		
H10	Intersection Main & Wing W.	½"ϕ	3'0"	36	2'0	
H6	" "	"	10'9	28	9'9	
H7	" "	"	4'6"	4	3'6	
H8	" "	"	5'6"	4	4'6	
H9	" "	"	4'3	4		Straight
B1	Under Bearings	"	2'6"	12		"
B2	" "	"	1'9"	16		"

Note: For H 14'or 15' lengths of all vertical bars accordingly

DIMENSION "A"

SUPERSTRUCTURE	A
Beam Spans 30' to 35' incl.	2'6½"
" " 40' to 45'	2'10"
" " 50'	2'11"
" " 60'	3'3"
Truss Span 100'	4'7½"
" " 120'	5'9½"
" " 150'	5'9½"

For all cases B-H-(A+3'0")

Size	D	L
½"ϕ	3"	8"
¾"ϕ	4½"	1'0"
⅞"ϕ	5½"	1'2"

HOOKS AND BENDS FOR REINFORCING BARS

QUANTITIES
FOR ONE ABUTMENT & WINGS

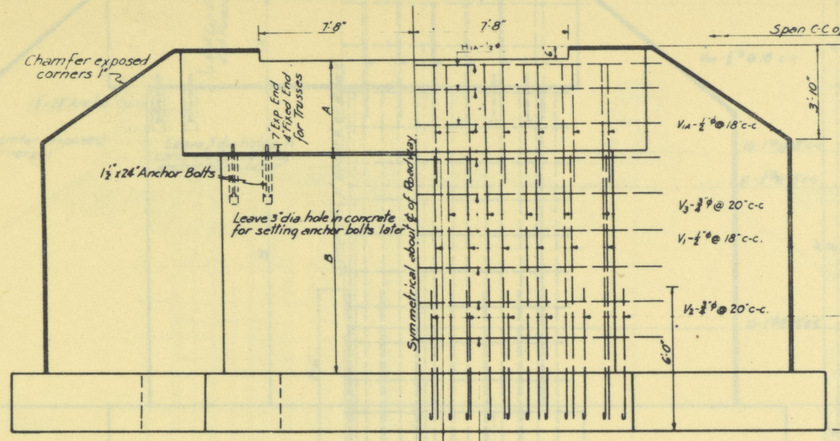
ITEM	H 14'-1"	H 15'-0"	H 16'-0"
Class B Concrete Cu Yds	43.6	45.7	48.0
Reinf. Steel Lbs	1990	2062	2082
Gravel Cu Yds	38.4	40.2	42.2
Sand Cu Yds	19.2	20.1	21.1
Cement Sacks	256	268	282

Note:
All concrete to be Class B, 1:2:4 mix.
Chamfer all exposed corners 1".
All rod dimensions shown are to centers of rods.

DESIGNED
CHECKED
TRACED
APPROVED
Regional Engineer

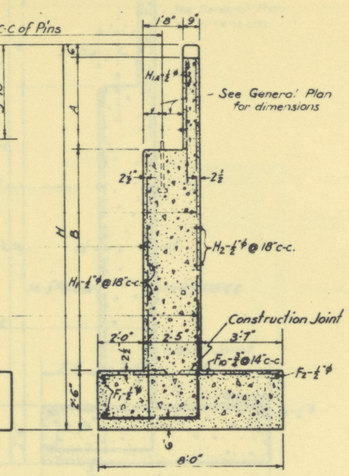
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No 1
CONCRETE ABUTMENTS
WITHOUT WINGS
HEIGHTS 14' TO 16'
FOR
I-BEAM OR STEEL TRUSS BRIDGE
12 FOOT ROADWAY.
JUNE 1935 SHEET 1 OF 1

DR. No 11



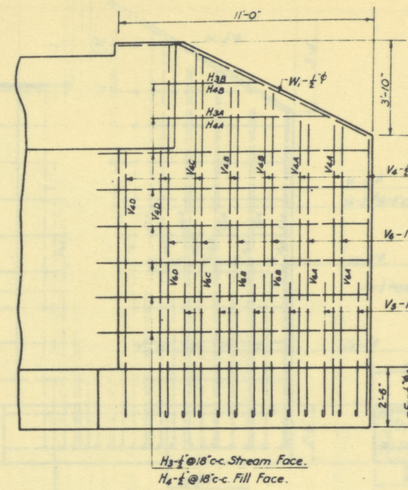
ELEVATION OF ABUTMENT

Scale: ⅜"=1'-0"



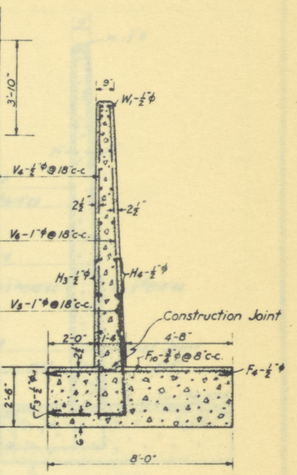
SECTION OF ABUTMENT

Scale: ⅜"=1'-0"



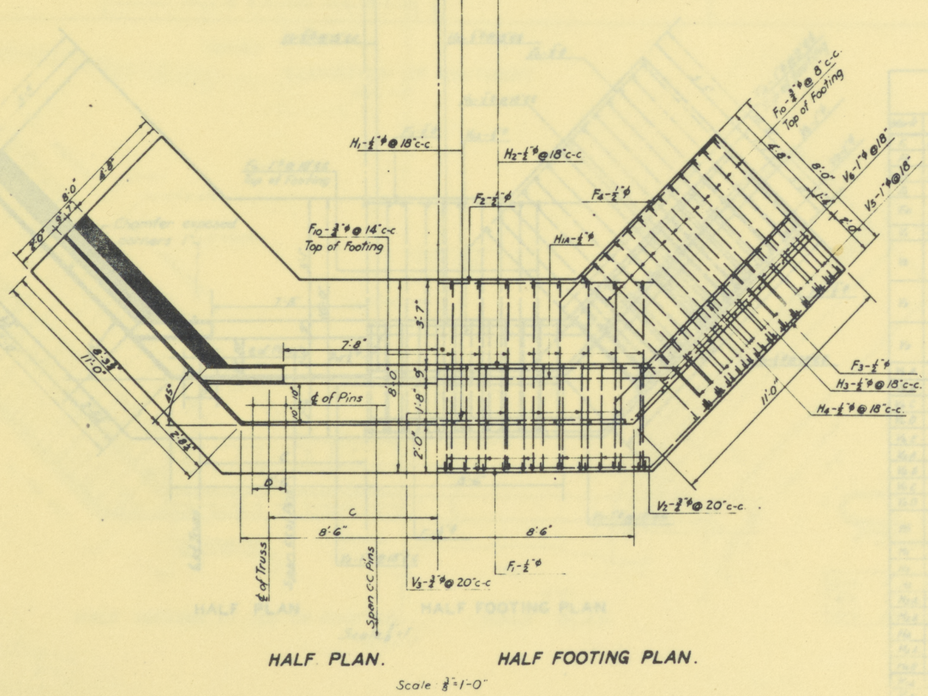
ELEVATION OF WING

Scale: ⅜"=1'-0"



WING SECTION.

Scale: ⅜"=1'-0"



HALF PLAN. HALF FOOTING PLAN.

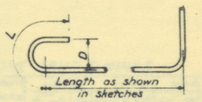
Scale ⅜"=1'-0"

ROD DETAILS FOR 2 ABUTMENTS. H=16'

Mark	Location	Size	Total Length	No Bars	Sketch
F_1	Main Footing	½"ø	18'-6"	4	
F_2	- -	½"ø	18'-6"	2	"
F_3	Wing -	½"ø	11'-8"	8	"
F_4	- -	½"ø	9'-8"	4	"
F_o	Top of Footing	⅜"ø	9'-3"	84	7'-3"
V_2	Main Wall	⅜"ø	9'-10"	24	3'-10" 5'-0"
V_3	Wing -	1"ø	9'-1"	24	2'-9"
V_3	Main -	⅜"ø	19'-7"	20	3'-10" 14'-9"
V_{4A}	Wing -	1"ø	16'-0"	8	12'-1" 2'-7½"
V_{4B}	- -	1"ø	17'-5"	8	13'-6"
V_{4C}	- -	1"ø	18'-9"	4	14'-10"
V_{4D}	- -	1"ø	19'-3"	4	15'-4"
W_1	- -	½"ø	11'-8"	4	Right Bend
V_1	Main -	½"ø	11'-2"	24	
V_4	Wing -	½"ø	11'-5"	4	"
V_{4A}	- -	½"ø	12'-3"	8	"
V_{4B}	- -	½"ø	13'-8"	8	"
V_{4C}	- -	½"ø	15'-0"	4	"
V_{4D}	- -	½"ø	11'-0"	8	"
H_1	Main -	½"ø	17'-0"	12	"
H_2	- -	½"ø	21'-2"	18	"
H_3	Wing -	½"ø	10'-8"	24	Field Bend
H_{3A}	- -	½"ø	6'-4"	4	"
H_{3B}	- -	½"ø	3'-4"	4	"
H_4	- -	½"ø	11'-0"	24	
H_{4A}	- -	½"ø	7'-4"	4	"
H_{4B}	- -	½"ø	4'-4"	4	"
H_{1A}	Main -	½"ø	20'-2"	6	"
V_{1A}	- -	½"ø	5'-0"	24	"

Note: For H=17'-0" add 1'-0" to length of all vertical bars.
" H=18'-0" " 2'-0" " " " " " " "

Size	D	L
½"	2½"	8"
⅝"	3"	10"
¾"	3½"	12"
⅞"	4½"	14"
1"	5"	16"



ROD HOOKS & BENDS.

QUANTITIES FOR ONE ABUTMENT & WINGS.

H	Class B Concrete Cu Yds.	Reinf. Steel Lbs.	Gravel Cu Yds	Sand Cu Yds	Cement Sacks	Lumber 2"×8" Rough	Lumber 1"×10" Shiplap	Wire #9 Soft	Nails 6d	Nails 10d	Nails 20d
16	50.0	2690	44.5	22	293	160pc.10'	119pc.16'	200#	100#	50#	50#
17	52.3	2810	46.5	23	306	165pc.10'	127pc.18'	-	-	-	-
18	54.6	2930	49.6	24	320	170pc.10'	135pc.16'	-	-	-	-

DIMENSIONS:

A=3'-9½" for 100' Truss - 12' Rdwy
=3'-9½" - 120' " " "
=3'-10⅛" - 140' " " "
=3'-9⅞" - 150' " " "
B=H-(A+3'-0")
C=7'-3" for 100' Truss - 12' Rdwy
=7'-3" - 120' " " "
=7'-4⅛" - 140' " " "
=7'-3" - 150' " " "
D=1'-5" - 100' " " "
=1'-5" - 120' " " "
=1'-7⅛" - 140' " " "
=1'-5½" - 150' " " "

Note:
All concrete to be Class "B", 1:2:4 mix.
Chamfer all exposed corners 1".
All rod dimensions shown are to centers of rods.

DESIGNED O. L. Kibbe
CHECKED A. L. K.
TRACED S. S. S.
APPROVED C. C. Thomas
Regional Engineer

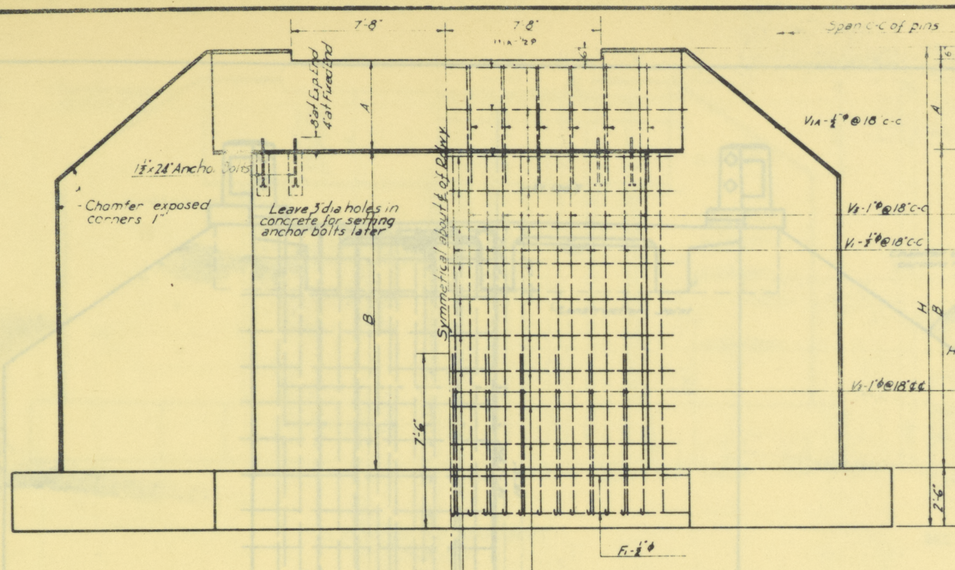
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1

CONCRETE ABUTMENTS.

WITHOUT PILES
HEIGHTS 16' TO 18'
FOR
STEEL TRUSS BRIDGE.
12 FOOT ROADWAY.

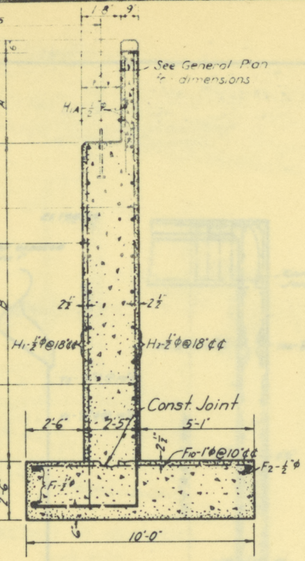
JULY 1935 SHEET 1 OF 1

Drg. No. 135.



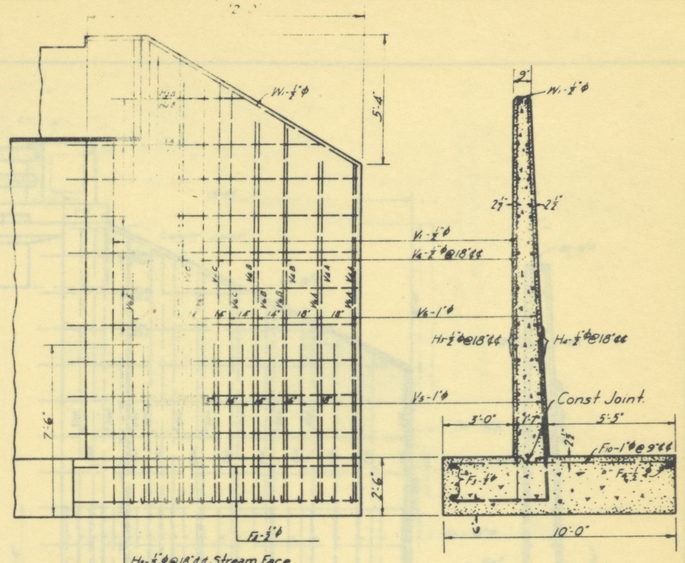
ELEVATION OF ABUTMENT

Scale ⅜"=1'



SECTION OF ABUTMENT

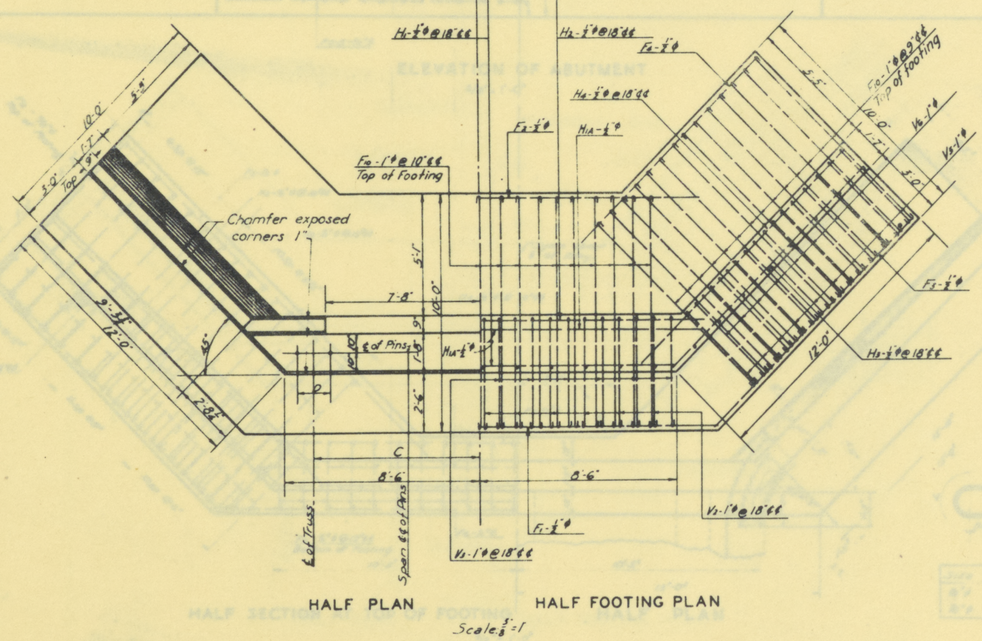
Scale ⅜"=1'



ELEVATION OF WING

WING SECTION

Scale ⅜"=1'



HALF PLAN HALF FOOTING PLAN

Scale ⅛"=1'

ROD DETAILS FOR 2 ABUTMENTS H=19'

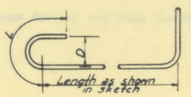
Mark	Location	Size	Total Length	No.	Sketch
F1	Main Footing	½"ø	20'-6"	4	
F2	" "	"	19'-0"	2	"
F3	Wing "	"	12'-3"	8	"
F4	" "	"	11'-0"	4	"
Fo	Footings	1"ø	11'-10"	94	9'-2"
V1	Main Wall	½"ø	14'-0"	26	
V2	" "	1"ø	12'-7½"	22	7'-0"
V3	" "	"	23'-4½"	24	17'-9"
V3	Wing	"	12'-3½"	32	7'-0"
V4A	" "	"	18'-4½"	8	13'-1"
V4B	" "	"	20'-0½"	8	14'-9"
V4C	" "	"	21'-4½"	8	16'-1"
V4D	" "	"	22'-6½"	8	17'-3"
V4E	" "	"	23'-5½"	4	18'-2"
V4A	" "	½"ø	13'-1"	8	
V4B	" "	"	14'-8"	8	"
V4C	" "	"	16'-5"	8	"
V4D	" "	"	18'-2"	4	"
W1	" "	"	13'-6"	8	Field Bend
H1	Main Walls	"	17'-0"	18	
H2	" "	"	20'-6"	22	"
H3	Wing "	"	11'-10"	32	"
H3A	" "	"	9'-10"	4	"
H3B	" "	"	6'-0"	4	"
H4	" "	"	12'-9"	32	"
H4A	" "	"	10'-6"	4	"
H4B	" "	"	7'-0"	4	"
H1A	Main Wall	"	20'-5"	4	"
V1A	" "	"	5'-0"	24	"

For H=20' or 21' increase lengths of all vertical bar accordingly.

QUANTITIES FOR ONE ABUT. & WINGS

H	Class B Concrete Cu Yds.	Reinf. Steel Lbs.	Gravel Cu Yds	Sand Cu Yds	Cement Sacks	Lumber For Rough	Lumber For Shiplap	Wire #9.5 oft	Nails 6d	Nails 10d	Nails 20d
19'	70.0	5,160#	623	308	408	175 pc 10	145 pc 16	200#	100	50	50
20'	72.5	5,290#	645	319	422	165 pc 12	151 pc 16	200#	100	50	50
21'	75.6	5,430#	681	333	441	174 pc 12	160 pc 16	200#	100	50	50

Size	D	L
⅜"	2½"	8"
1"	5"	16"



ROD - HOOKS & BENDS

DIMENSIONS

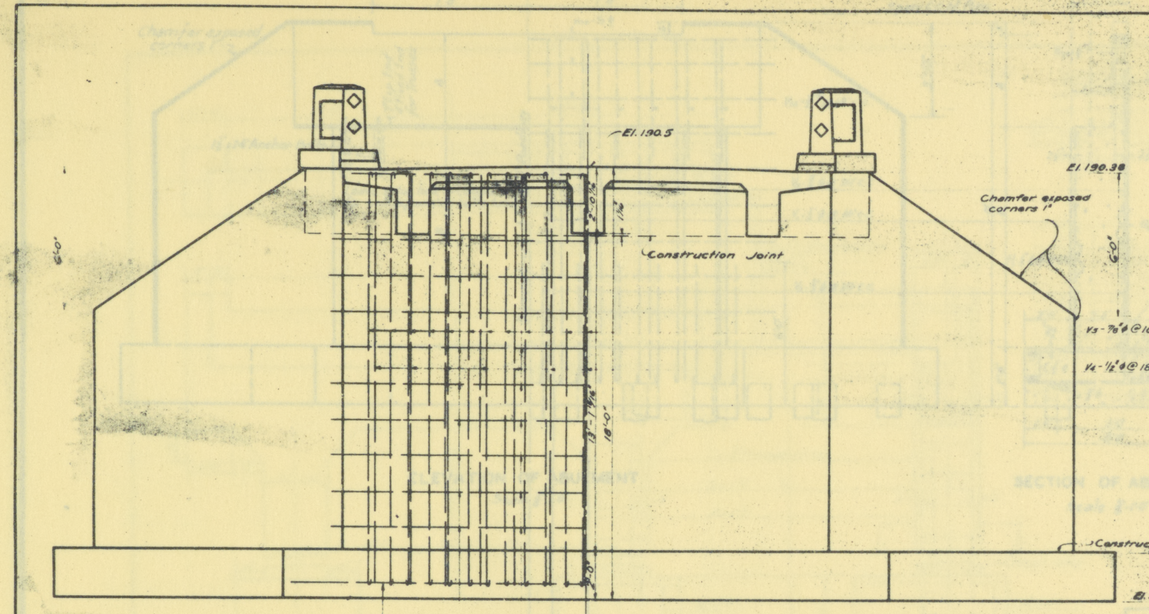
Dimension	Length of Truss 100'	120'	140'	150'
A	3'-9½"	3'-9½"	3'-10½"	3'-9½"
B	A ± 3'-0"			
C	7'-5"	7'-5"	7'-6½"	7'-5"
D	1'-5"	1'-5"	1'-7½"	1'-5½"

Note:
All concrete to be Class "B", 1:2:4 mix.
Chamfer all exposed corners 1".
All rod dimensions shown are to centers of rods.

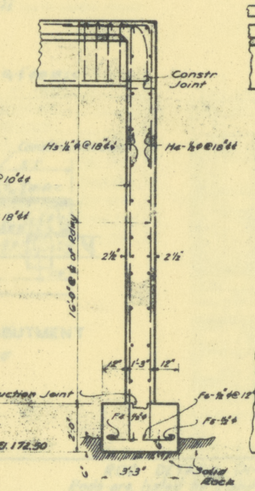
DESIGNED T. C. Nutt
TRACED L.H.C.
CHECKED J. L. B.
APPROVED [illegible] Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE ABUTMENTS
WITHOUT PILES
HEIGHTS 19' TO 21'
FOR
STEEL TRUSS BRIDGE
12 FOOT ROADWAY
SEPT. 1934 SHEET 1 OF 1

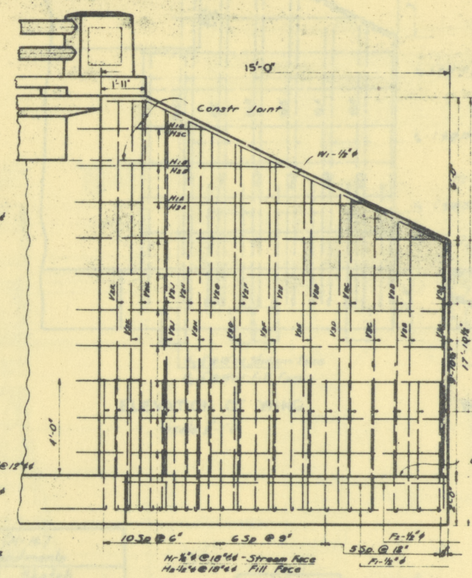
Drg No 136.



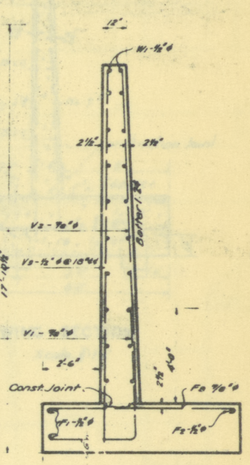
ELEVATION OF ABUTMENT
3/8"= 1'-0"



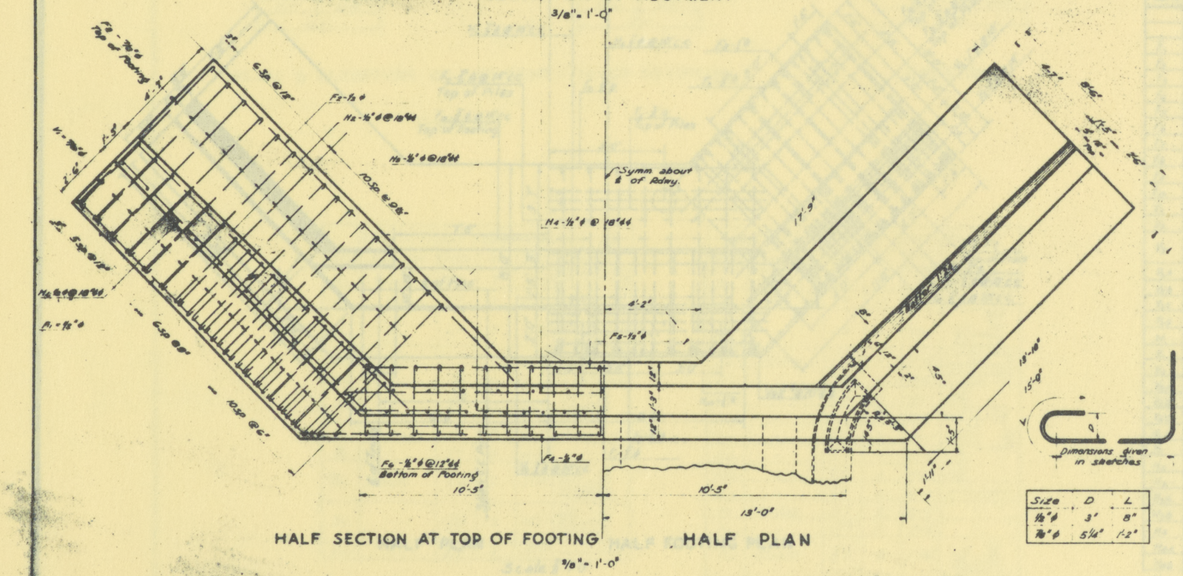
SECTION



WING ELEVATION
3/8"= 1'-0"



WING SECTION
3/8"= 1'-0"



HALF SECTION AT TOP OF FOOTING HALF PLAN
3/8"= 1'-0"

Size	D	L
½"ϕ	3"	8"
⅞"ϕ	5¼"	1'-2"

Rod Details for One Abutment

Mark	Location	Size	Total Length	No	Sketch
F1	Wing Footing	⅝"ϕ	13'-9"	4	
F2	" "	"	18'-0"	2	"
F3	" "	⅞"ϕ	9'-0½"	34	
F4	Main Wall Footing	½"ϕ	26'-0"	2	
F5	" " "	"	22'-0"	2	"
F6	" " "	"	6'-0	21	
V1	Wing	⅞"ϕ	10'-0"	42	
V2A	"	⅞"ϕ	5'-9"	2	
V2B	"	"	10'-8"	2	"
V2C	"	"	11'-7"	2	"
V2D	"	"	12'-4"	2	"
V2E	"	"	13'-0"	2	"
V2F	"	"	13'-9"	2	"
V2G	"	"	14'-4"	2	"
V2H	"	"	14'-9"	2	"
V2J	"	"	15'-3"	2	"
V2K	"	"	15'-8	4	"
V3A	"	½"ϕ	11'-3"	2	"
V3B	"	"	12'-0"	2	"
V3C	"	"	12'-7"	2	"
V3D	"	"	13'-3"	2	"
V3E	"	"	14'-0"	2	"
V3F	"	"	14'-8"	2	"
V3G	"	"	15'-4"	2	"
V3H	"	"	16'-0"	2	"
V3J	"	"	16'-9"	2	"
V3K	"	"	17'-2"	2	"
V4	Main Wall	"	17'-2"	18	
V5	" "	⅞"ϕ	19'-1"	23	
W1	Wings	½"ϕ	14'-9"	14	
W1A	"	"	11'-3"	2	"
W1B	"	"	8'-0"	2	"
W1C	"	"	4'-6"	2	"
W2	Wings	½"ϕ	15'-9"	14	
W2A	"	"	12'-3"	2	"
W2B	"	"	8'-8"	2	"
W2C	"	"	5'-6"	2	"
W3	Main Wall	"	20'-10"	10	"
W4	" "	"	22'-0"	11	"
W1	Wings	"	15'-6"	4	"

NOTES

All concrete to be Class B. Class B concrete to be approx 1:2:4 mix with not less than 5⅞ sacks of cement per cu. yd.

Maximum aggregate 1½ inches.

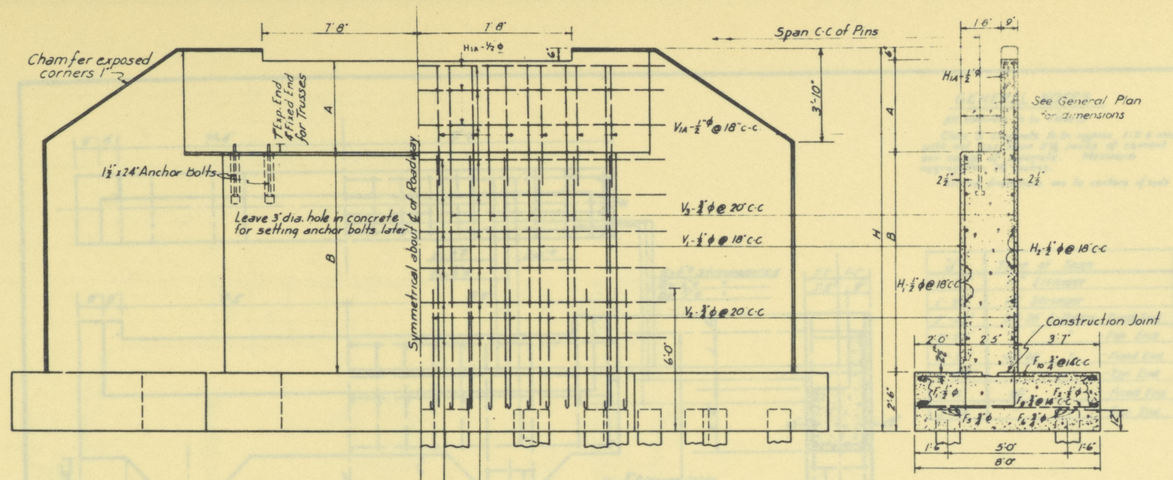
Main Wall designed for equivalent live load surcharge of 2 Feet.

Wings designed for no live load surcharge.

Designed O. L. Kahl
Traced J. Swan
Checked
Approved E. C. Theisen Regional Engineer

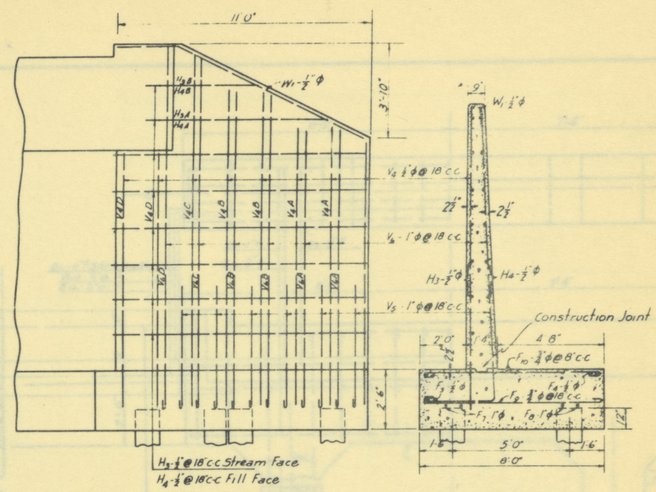
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No. 1
CONCRETE ABUTMENTS
BIRD CREEK BRIDGE
ST. JOE RIVER PROJECT NO 218
SEC. 13 T. 45 N. R. 6 E.
St Joe National Forest
OCT. 1935 Sheet 3 of 3

Drg. No. 155



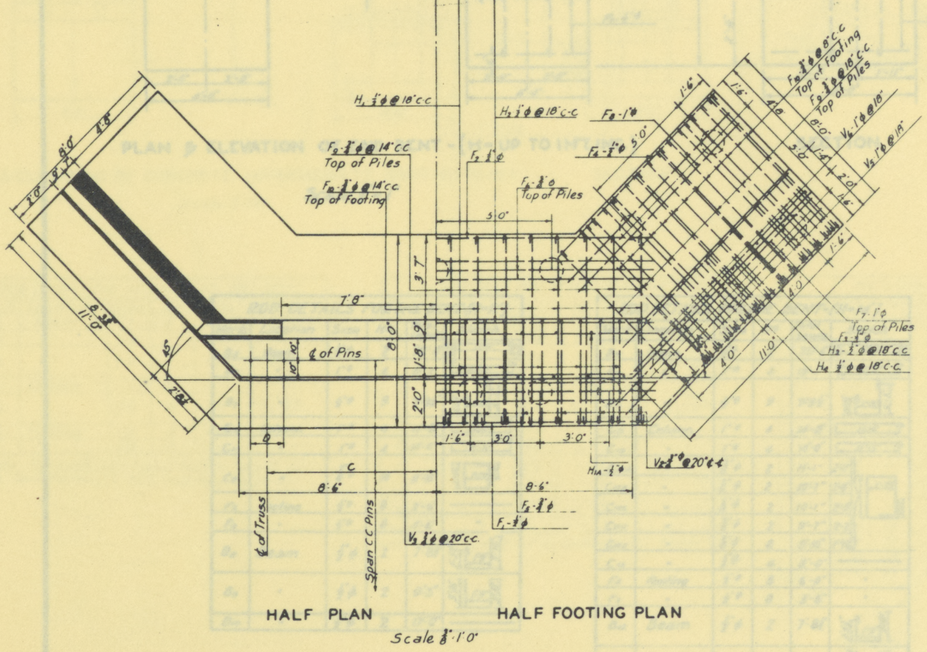
ELEVATION OF ABUTMENT
Scale ⅜"-1'-0"

SECTION OF ABUTMENT
Scale ⅜"-1'-0"



ELEVATION OF WING
Scale ⅜"-1'-0"

WING SECTION
Scale ⅜"-1'-0"



HALF PLAN HALF FOOTING PLAN
Scale ⅜"-1'-0"

ROD DETAILS (H-16')
Rods are listed for 2 abutments

Mark	Location	Size	Total Length	No	Sketch
F_1	Main Footing	¾ ϕ	18'-4"	4	
F_2	" "	¾ ϕ	18'-4"	4	"
F_3	Wing "	¾ ϕ	11'-8"	8	"
F_4	" "	¾ ϕ	9'-8"	4	"
F_5	Top of Piles	¾ ϕ	20'-0"	6	"
F_6	" " "	¾ ϕ	20'-0"	6	"
F_7	" " "	1" ϕ	12'-0"	8	"
F_8	" " "	1" ϕ	10'-10"	8	"
F_9	" " "	¾ ϕ	9'-3"	60	
F_{10}	Top of Footing	¾ ϕ	9'-3"	84	2'-3"
V_2	Main Wall	¾ ϕ	9'-10"	24	3'-10" 2'-9" 3'-0"
V_3	Wing "	1" ϕ	9'-1"	24	3'-10" 14'-2"
V_3	Main "	¾ ϕ	19'-0"	20	
V_{3A}	Wing "	1" ϕ	15'-5"	8	11'-6" 4'-1"
V_{3B}	" "	1" ϕ	16'-9"	8	12'0"
V_{3C}	" "	1" ϕ	18'-2"	4	14'-3"
V_{3D}	" "	1" ϕ	18'-8"	4	14'-9"
W_1	" "	¾ ϕ	11'-8"	4	Field Bend
V_1	Main "	¾ ϕ	10'-6"	24	
V_4	Wing "	¾ ϕ	10'-10"	4	"
V_{4A}	" "	¾ ϕ	11'-8"	8	"
V_{4B}	" "	¾ ϕ	13'-0"	8	"
V_{4C}	" "	¾ ϕ	14'-6"	4	"
V_{4D}	" "	¾ ϕ	10'-4	8	"
H_1	Main "	¾ ϕ	17'-0	12	"
H_2	" "	½ ϕ	21'-2"	18	"
H_3	Wing "	½ ϕ	10'-8"	24	"
H_{3A}	" "	½ ϕ	6'-4"	4	"
H_{3B}	" "	½ ϕ	3'-4"	4	"
H_4	" "	⅝ ϕ	11'-0"	24	"
H_{4A}	" "	⅝ ϕ	7'-4"	4	"
H_{4B}	" "	⅝ ϕ	4'-4"	4	"
H_{1A}	Main "	½ ϕ	20'-2"	6	"
V_{1A}	" "	1" ϕ	5'-0"	24	"

For H=17' or 18' increase lengths of all vertical bars accordingly.

Size	D	L
½"	2½"	8"
⅝"	3"	10"
¾"	3¾"	12"
⅞"	4½"	14"
1"	5"	16"

ROD HOOKS & BENDS

QUANTITIES FOR ONE ABUTMENT & WINGS

H	Class B Concrete Cu Yds	Reinf. Steel Lbs	Gravel Cu Yds	Sand Cu Yds	Cement Sacks	Lumber 2"x8" Rough	Lumber 1"x8" Shiplap	Wire 9 Soft	Nails 6d	Nails 10d	Nails 20d
16	50.0	3500	44.5	22	293	160pc 10'	119pc 16'	200#	100#	50#	50#
17	52.3	3620	46.5	23	306	165pc 10'	127pc 16'	"	"	"	"
18	54.6	3740	49.6	24	320	170pc 10'	135pc 16'	"	"	"	"

DIMENSIONS
A - 3'-9⅜" for 100 Truss-12' Rdwy
- 3'-9⅜" " 120' " " "
- 3'-10⅛" " 140' " " "
- 3'-9⅜" " 150' " " "
B - H-(A+3'-0")
C - 1'-3" for 100 Truss-12' Rdwy
- 1'-3" " 120' " " "
- 1'-4⅛" " 140' " " "
- 1'-3" " 150' " " "
D - 1'-5" " 100' " " "
- 1'-5" " 120' " " "
- 1'-7⅛" " 140' " " "
- 1'-5¼" " 150' " " "

Note:
All concrete to be Class "B", 1:2:4 mix.
Chamfer all exposed corners 1".
All rod dimensions shown are to centers of rods.

DESIGNED J.J.B.
CHECKED A.L.K.
TRACED C.E.C.
APPROVED C.E. Chessman
Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE ABUTMENTS
WITH PILES
HEIGHTS 16' TO 18'
FOR
STEEL TRUSS BRIDGE
12 FOOT ROADWAY
APRIL 1934 SHEET 1 OF 1

DR. NO. 20

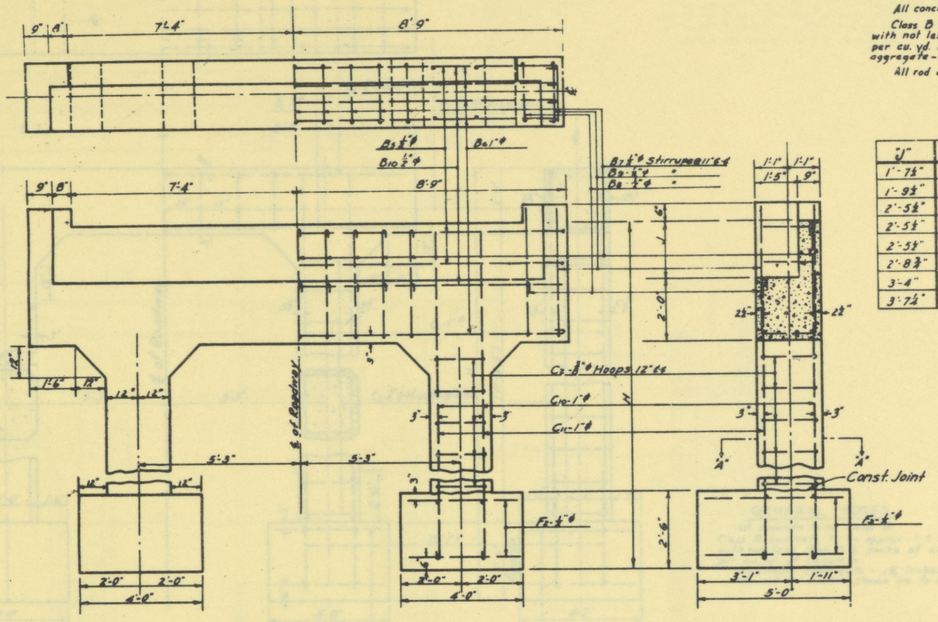
GENERAL NOTES

All concrete to be Class B

Class B concrete to be approx. 1:2½:4 mix with not less than 5½ sacks of cement per cu. yd. of concrete. Maximum aggregate - 1½ inches.

All rod dimensions are to centers of rods

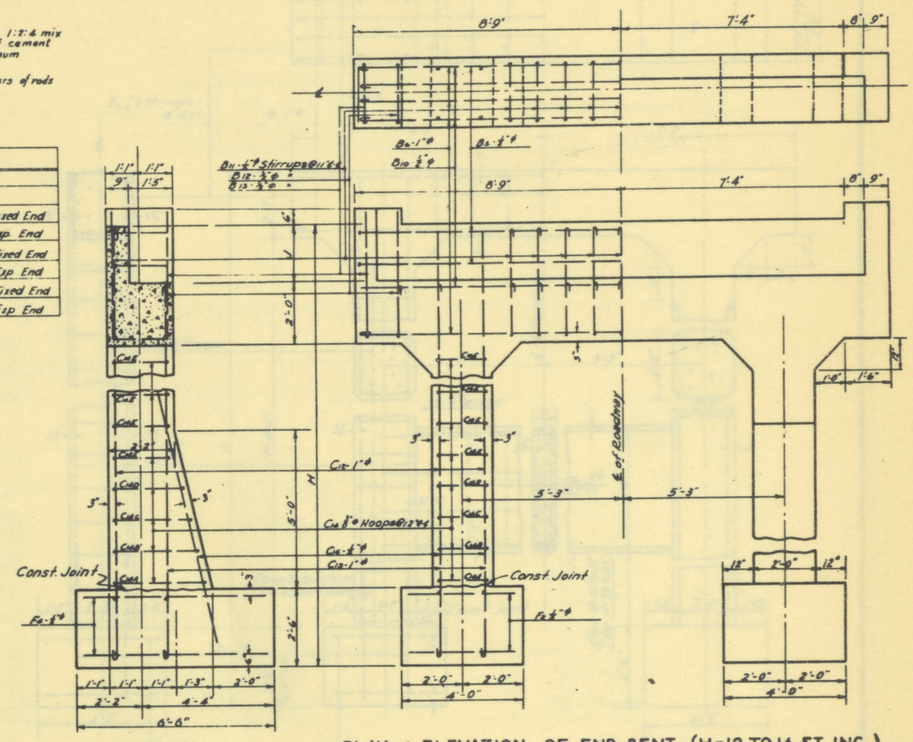
"J"	Type of Span		
1'-7½"	14" Stringer		
1'-9½"	16" Stringer		
2'-5½"	30'-36' I-Beam	Fixed End	
2'-5½"	" "	"	Exp. End
2'-5½"	42'-48'	"	Fixed End
2'-8¾"	" "	"	Exp. End
3'-4"	60'	"	Fixed End
3'-7½"	"	"	Exp. End



PLAN & ELEVATION OF END BENT - (H = UP TO 11 FT. INC.)

SECTION

Scale ½" = 1'



SECTION

PLAN & ELEVATION OF END BENT - (H = 12 TO 14 FT. INC.)

Scale ½" = 1'

ROD DETAILS FOR ONE BENT - (H = 11')

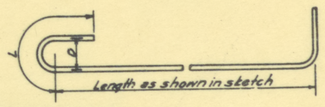
Mark	Location	Size	No	Total Length	Sketch
B_8	Beam	¾"ø	2	20'-6"	17'-0"
B_9	"	1"ø	4	19'-1"	16'-9"
B_7	"	¾"ø	9	7'-9½"	6'-3"
C_{10}	Column	1"ø	4	11'-8"	10'-6"
C_{11}	"	1"ø	4	10'-0"	8'-8"
C_7	"	⅜"ø	10	8'-10"	7'-6"
F_2	Footing	¾"ø	8	3'-6"	
F_3	"	¾"ø	8	4'-6"	"
B_2	Beam	½"ø	2	7'-8½"	1'-9"
B_6	"	½"ø	2	9'-5"	1'-9"
B_{10}	"	¾"ø	2	17'-0"	

ROD DETAILS FOR ONE BENT - (H = 14')

Mark	Location	Size	No	Total Length	Sketch
B_1	Beam	¾"ø	2	20'-6"	17'-0"
B_4	"	1"ø	4	19'-1"	16'-9"
B_{11}	"	¾"ø	9	7'-9½"	6'-3"
C_{12}	Column	1"ø	4	14'-8"	13'-6"
C_{13}	"	1"ø	4	13'-0"	11'-8"
C_{14A}	"	⅜"ø	2	11'-1"	2'-11"
C_{14B}	"	⅜"ø	2	10'-7"	2'-8"
C_{14C}	"	⅜"ø	2	10'-1"	2'-5"
C_{14D}	"	⅜"ø	2	9'-7"	2'-2"
C_{14E}	"	⅜"ø	8	8'-10"	1'-9"
C_{15}	"	¾"ø	4	8'-0"	
F_4	Footing	¾"ø	8	6'-0"	"
F_5	"	¾"ø	8	3'-6"	"
B_{12}	Beam	½"ø	2	7'-8½"	1'-9"
B_{13}	"	½"ø	2	9'-5"	1'-9"
B_{10}	"	¾"ø	2	17'-0"	

MATERIAL FOR ONE BENT

H	Class B Concrete Cu Yds	Cement Sacks	Sand Cu Yds	Gravel Cu Yds	Bent. Steel Weight	Form Lumber 2"-6"-S4S	Form Lumber Fill S4S&tg
9	8.25	49	3.63	7.26	687	47 pcs. 10	29 pcs. 16
10	8.57	51	3.77	7.54	721	45 - 11"	31 " 16
11	8.89	52	3.91	7.82	755	47 - 12"	33 " 16
12	10.78	63	4.74	9.48	832	49 - 14"	34 " 16
13	11.00	65	4.83	9.66	858	50 - 14"	36 " 16
14	11.45	67	5.03	10.06	882	50 - 16"	37 " 16



Size	D	L
¾"ø	2¾"	8"
1"ø	3"	16"

DESIGNED J.J.B.
CHECKED A.H.M.
TRACED E.H.T.
APPROVED C.E.K. Regional Engineer

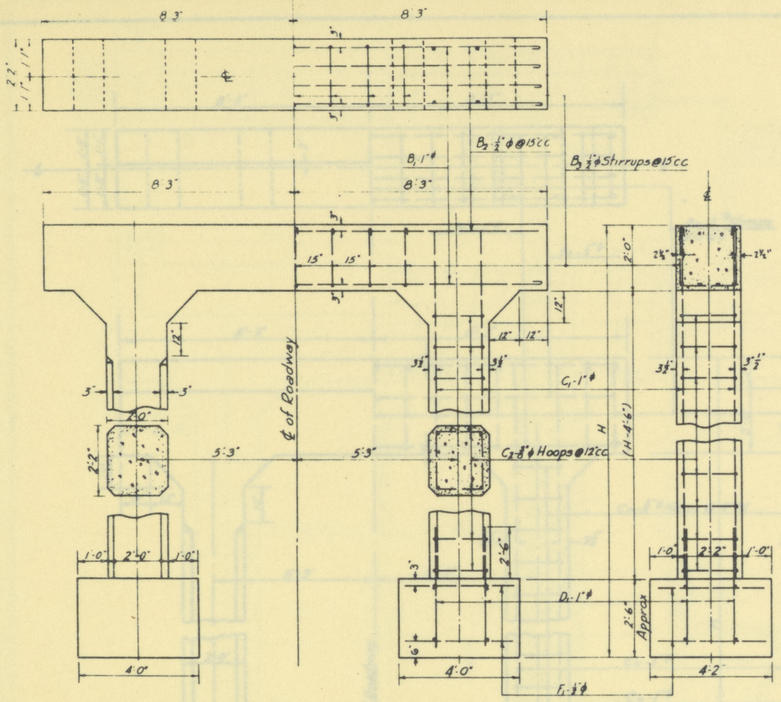
7/6/37

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE END BENTS
HEIGHTS UP TO 14' INCL.
12 FOOT ROADWAY

MAY 1934 Revised Sept 1934

SHEET 1 OF 1

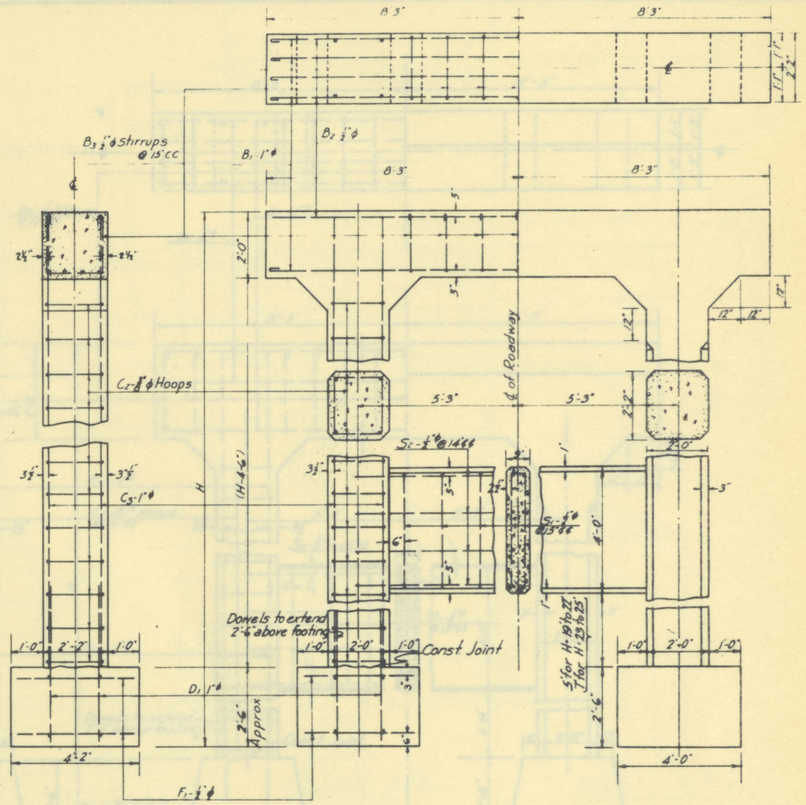
DR. NO. 34



PLAN & ELEVATION OF CONCRETE INTERMEDIATE BENT-(H TO 18')

Scale ½"-1'0"

SECTION



SECTION

PLAN & ELEVATION OF CONCRETE INTERMEDIATE BENT (18' TO 25')

Scale ½"-1'0"

GENERAL NOTES

All concrete to be Class B.
Class B concrete to be approx 1:2:4 mix with not less than 5½ sacks of cement per cu. yd. of concrete.
Maximum aggregate - 1½ inches
All rod dimensions shown are to centers of rods.

ROD DETAILS FOR HEIGHT-H-10'-ONE BENT

Mark	Location	Size	No	Total Length	Sketch
B_1	Beam	1"ϕ	4	18'-5"	
B_2	-	½"ϕ	2	16'-0"	
B_3	-	½"ϕ	7	6'-0"	
C_1	Column	1"ϕ	8	7'-3"	
C_2	-	⅜"ϕ	10	8'-8"	
D_1	Footing	1"ϕ	8	4'-6"	
F_1	-	½"ϕ	16	3'-6"	

Note. For each additional foot in height add one foot to length of C_1 and two hoops C_2

ROD DETAILS FOR HEIGHT-H-19'-ONE BENT

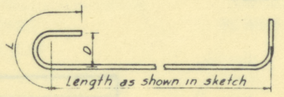
Mark	Location	Size	No	Total Length	Sketch
B_1	Beam	1"ϕ	4	18'-5"	
B_2	-	½"ϕ	2	16'-0"	
B_3	-	½"ϕ	7	6'-0"	
C_3	Column	1"ϕ	8	16'-5"	
C_2	-	⅜"ϕ	28	8'-8"	
D_1	Footing	1"ϕ	8	4'-6"	
F_1	-	½"ϕ	16	3'-6"	
S_1	Strut	½"ϕ	7	7'-6"	
S_2	-	½"ϕ	8	11'-2"	

Note. For each additional foot in height add one foot to length of C_3 and add two hoops C_4

MATERIAL FOR ONE BENT

H	Class B Concrete Cu Yds.	Cement Sacks	Sand Cu Yds	Gravel Cu Yds	Reinf Steel Weight	Form Lumber 2"x6" 545	2"x10" Shlp
10	7.91	47	3.56	7.05	634	45 pc 12'	31 pc 16'
11	8.22	48	3.70	7.32	728	47 - 12'	33 - 16'
12	8.55	50	3.85	7.60	762	49 - 14'	34 - 14'
13	8.87	52	4.00	7.90	796	50 - 14'	36 - 16'
14	9.19	54	4.13	8.17	830	52 - 16'	37 - 16'
15	9.52	56	4.28	8.48	864	53 - 16'	39 - 16'
16	9.84	58	4.43	8.75	898	55 - 18'	40 - 16'
17	10.16	60	4.58	9.02	932	58 - 18'	42 - 16'
18	10.48	62	4.71	9.32	966	116 - 10'	43 - 16'
19	11.80	69	5.20	10.50	1084	112 - 12'	48 - 16'
20	12.12	71	5.34	10.80	1088	114 - 12'	49 - 16'
21	12.44	73	5.48	11.10	1122	116 - 12'	49 - 16'
22	12.76	75	5.61	11.37	1156	118 - 12'	49 - 16'
23	13.08	77	5.75	11.65	1190	120 - 12'	49 - 16'
24	13.40	79	5.90	11.95	1224	122 - 12'	49 - 16'
25	13.72	81	6.14	12.35	1258	124 - 12'	49 - 16'

Nails 6d - 100#
10d - 50#
20d - 20#
Wire #9 Soft 25#
#16 Soft 25#



Size	D	L
½"	2½"	8"
1"	5"	16"

DESIGNED A.B.B.
CHECKED W.J.K.
TRACED E.J.C.
1934 APPROVED [illegible] Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1

CONCRETE INTERMEDIATE BENTS

FOR ADJACENT SPANS OF THE SAME DEPTH
HEIGHTS 10' TO 25' INCL.
12 FT ROADWAY

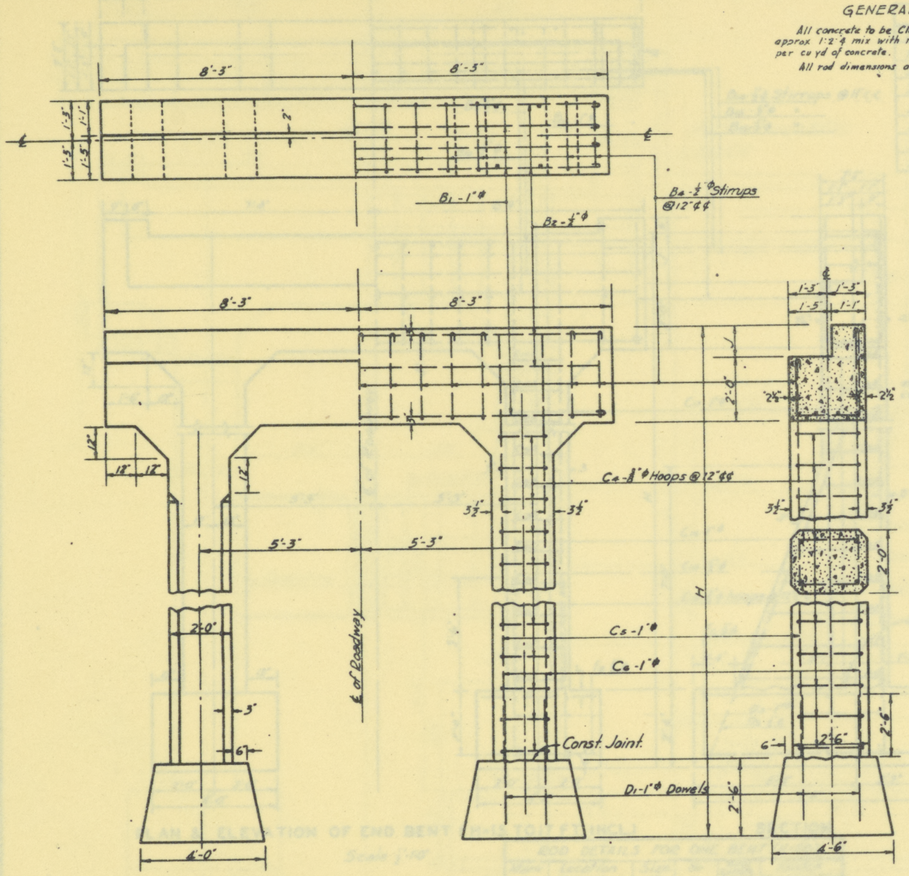
MAY 1934 Revised Sept 1934 SHEET 1 OF 1

DR. NO. 31

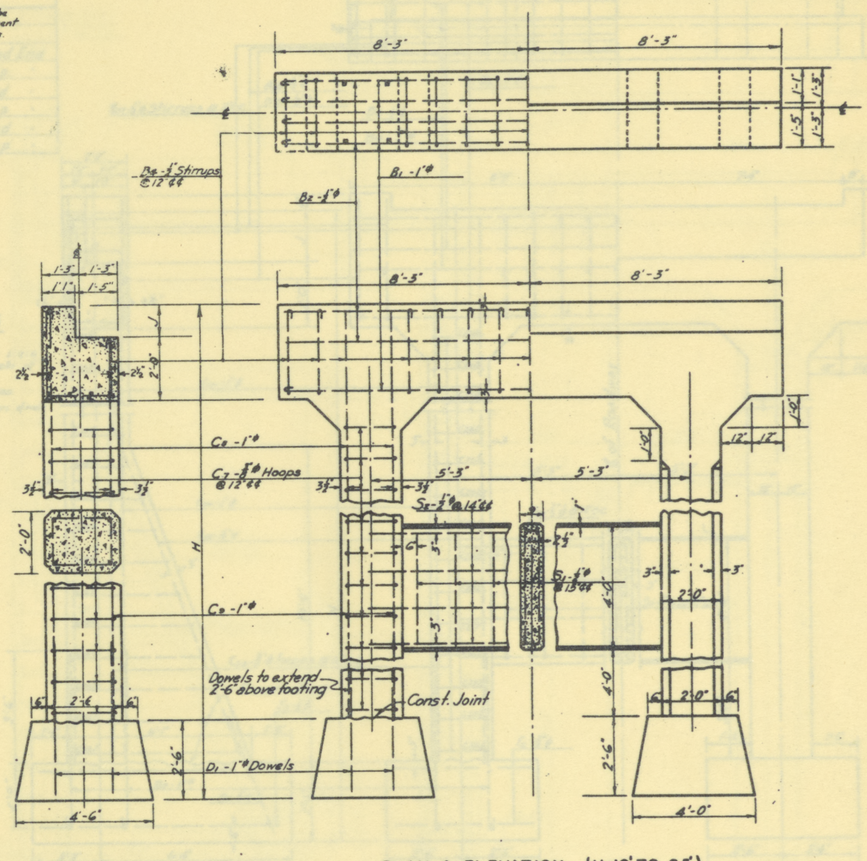
GENERAL NOTES

All concrete to be Class B. Class B concrete to be approx 1:2:4 mix with not less than 5¾ sacks of cement per cu yd of concrete. Maximum aggregate 1½ inches.

All rod dimensions are to centers of rods.



PLAN & ELEVATION (H=TO 18')



SECTION

PLAN & ELEVATION (H=19' TO 25')

ROD DETAILS FOR ONE BENT (H=10ft.)

Mark	Location	Size	No.	Total Length	Sketch
B1	Beam	1"ϕ	4	18'-3"	18'-3"
B2	"	⅝"ϕ	3	16'-0"	
B3	"	½"ϕ	13	7'-4"	2'-1"
C6	Column	⅞"ϕ	10	9'-4"	2'-1"
C5	"	1"ϕ	4	6'-3"	
C6	"	1"ϕ	4	7'-3"	
D1	Footing	1"ϕ	8	4'-6"	

For each additional foot in height add one foot to the length of C5 & C6 and add two hoops C6.

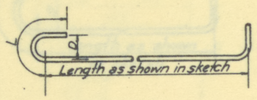
ROD DETAILS FOR ONE BENT -(H=19ft.)

Mark	Location	Size	No.	Total Length	Sketch
B1	Beam	1"ϕ	4	18'-3"	18'-3"
B2	"	⅝"ϕ	3	16'-0"	
B3	"	½"ϕ	13	7'-4"	2'-1"
C7	Column	⅞"ϕ	28	9'-4"	2'-1"
C6	"	1"ϕ	4	16'-3"	
C5	"	1"ϕ	4	15'-3"	
D1	Footing	1"ϕ	8	4'-6"	
S1	Strut	¾"ϕ	7	7'-6"	3'-3"
S2	"	¾"ϕ	8	11'-2"	

For each additional foot in height add one foot to the length of C5 & C6 & add two hoops C7.

MATERIAL FOR ONE BENT

H	Class B Conc. Cu. Yds	Cement Sacks	Sand Cu. Yds.	Gravel Cu. Yds.	Reinf. Steel height	Form Lumber 2"x6"-S4S	Form Lumber 1"x12"-Rough	Nails 6d	Nails 10d	Nails 20d	Wire #9 Soft
10'	7.91	47	3.56	7.05	690	45 pc 12	31 pc 16	100#	50#	70#	100#
11'	8.22	48	3.70	7.32	725	47 - 12	32 - "	"	"	"	"
12'	8.55	50	3.85	7.60	760	49 - 14	34 - "	"	"	"	"
13'	8.87	52	4.00	7.90	795	50 - 14	36 - "	"	"	"	"
14'	9.19	54	4.13	8.12	830	52 - 16	37 - "	"	"	"	"
15'	9.52	56	4.28	8.48	865	53 - 16	39 - "	"	"	"	"
16'	9.84	58	4.43	8.75	900	55 - 18	40 - "	"	"	"	"
17'	10.16	60	4.58	9.02	935	58 - 18	42 - "	"	"	"	"
18'	10.48	62	4.71	9.32	970	116 - 10	43 - "	"	"	"	"
19'	11.81	70	5.20	10.50	1073	110 - 12	50 - "	"	"	"	"
20'	12.18	72	5.35	10.80	1108	112 - 12	51 - "	"	"	"	"
21'	12.55	74	5.52	11.15	1143	114 - 12	53 - "	"	"	"	"
22'	12.92	76	5.68	11.50	1178	109 - 16	54 - "	"	"	"	"
23'	13.29	78	5.85	11.82	1213	107 - 14	55 - "	"	"	"	"
24'	13.66	80	6.00	12.12	1248	109 - 14	57 - "	"	"	"	"
25'	14.03	82	6.18	12.50	1285	111 - 16	59 - "	"	"	"	"



Size	D	L
¾"	2¾"	8"
1"	5"	16"

DESIGNED J.J.B.
CHECKED A.L.R.
TRACED J.V.C.
APPROVED Chief, C.&E.O. Section
Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1

CONCRETE INTERMEDIATE BENTS

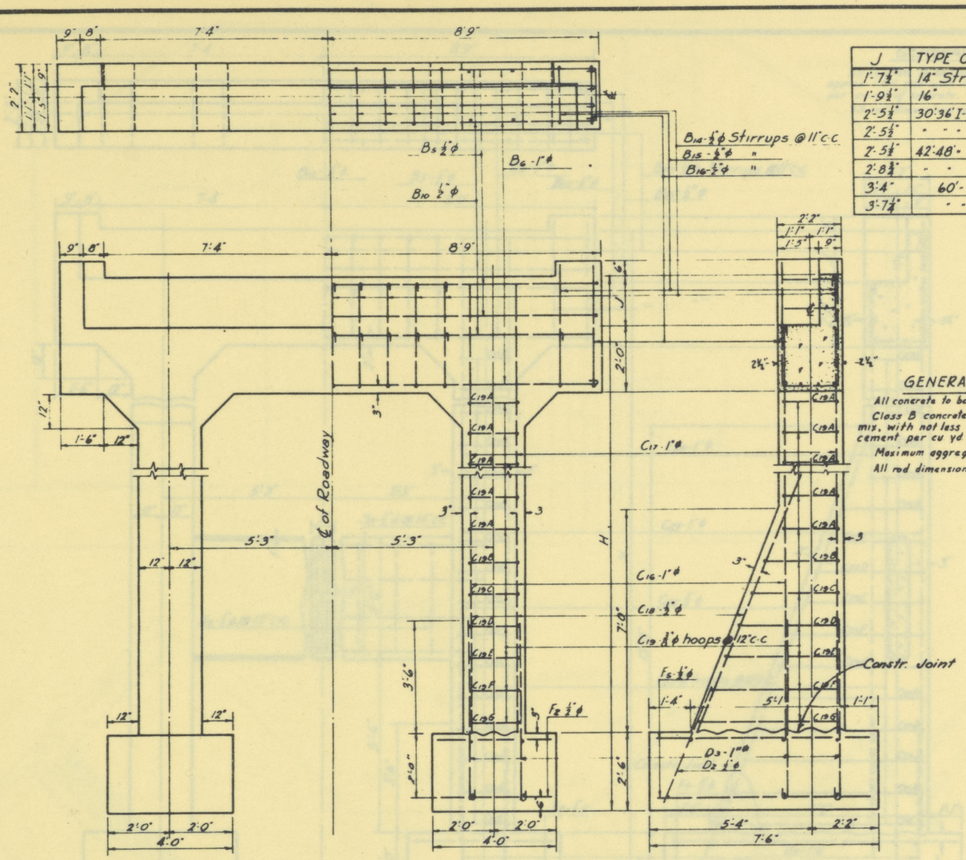
FOR ADJACENT SPANS OF UNEQUAL DEPTH
HEIGHTS 10' TO 25' INCL.
12 FT. ROADWAY

MAY 1934 Revised Sept 1934

SHEET 1 OF 1

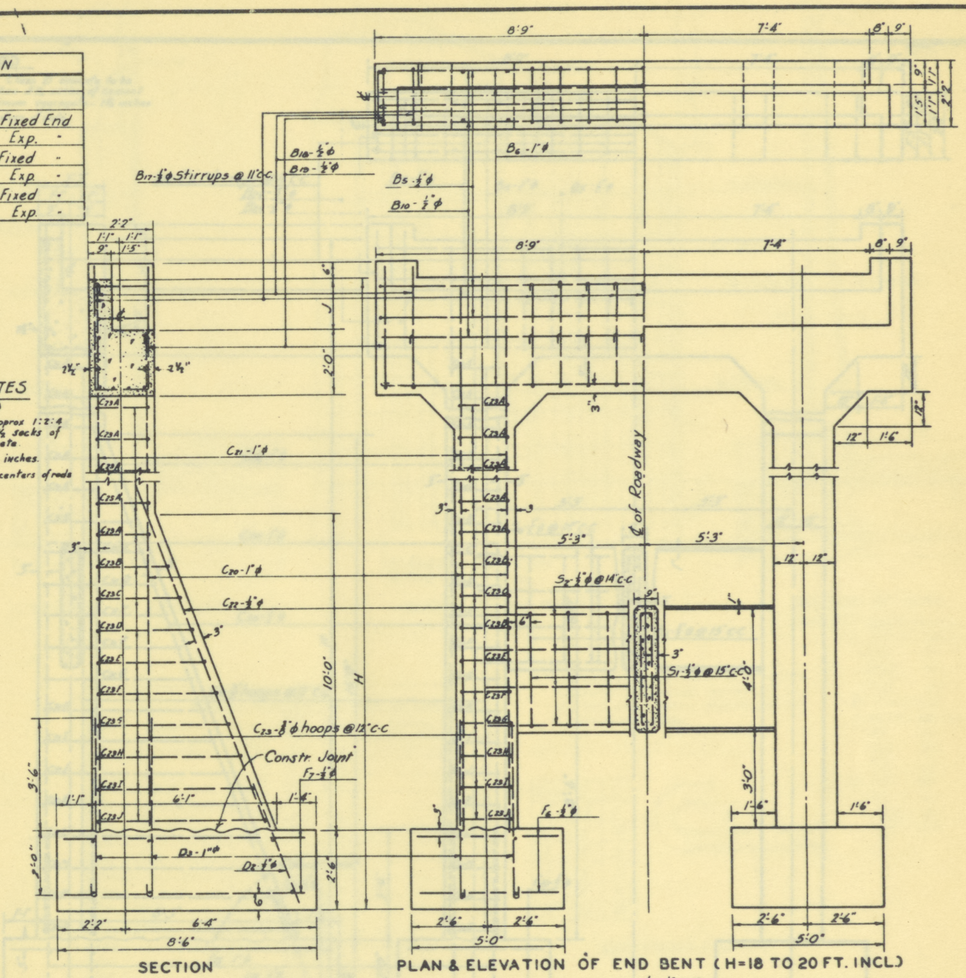
DR. NO. 35

J	TYPE OF SPAN
1'-7½"	14" Stringer
1'-9½"	16" "
2'-5½"	30'36' I-Beam Fixed End
2'-5½"	" " " Exp. "
2'-5½"	42'48' " Fixed "
2'-8½"	" " " Exp. "
3'-4"	60'- " Fixed "
3'-7½"	" " " Exp. "



PLAN & ELEVATION OF END BENT (H=15 TO 17 FT. INCL.)
Scale ½"-1'-0"

SECTION



SECTION
Scale ½"-1'-0"

PLAN & ELEVATION OF END BENT (H=18 TO 20 FT. INCL.)
Scale ½"-1'-0"

ROD DETAILS FOR ONE BENT (H-17)

Mark	Location	Size	No	Total Length	Sketch
B5	Beam	½"ϕ	2	20'6"	
B6	"	1"ϕ	4	19'1"	
B14	"	⅝"ϕ	9	7'9½"	
C16	Column	1"ϕ	4	18'6"	
C17	"	1"ϕ	4	20'3"	
D3	"	1"ϕ	8	6'10"	
C18	"	⅝"ϕ	4	10'0"	
C19A	"	⅝"ϕ	10	8'10"	
C19B	"	⅝"ϕ	2	9'11"	
C19C	"	⅝"ϕ	2	10'3"	
C19D	"	⅝"ϕ	2	11'7"	
C19E	"	⅝"ϕ	2	12'5"	
C19F	"	⅝"ϕ	2	13'3"	
C19G	"	⅝"ϕ	2	14'1"	
F2	Footing	½"ϕ	12	3'6"	
F5	"	½"ϕ	8	7'0"	
D2	Column	½"ϕ	4	4'0"	
B13	Beam	½"ϕ	2	7'8½"	
B12	"	½"ϕ	2	9'5"	
B10	"	½"ϕ	2	17'0"	

ROD DETAILS FOR ONE BENT (H-20)

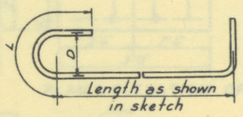
Mark	Location	Size	No	Total Length	Sketch
S2	Beam	½"ϕ	2	20'6"	
B10	"	½"ϕ	2	17'0"	
B6	"	1"ϕ	4	19'1"	
B17	"	½"ϕ	9	7'9½"	
B16	"	½"ϕ	2	7'8½"	
B19	"	½"ϕ	2	9'5"	
C20	Column	1"ϕ	4	15'6"	
C21	"	1"ϕ	4	17'3"	
C22	"	⅝"ϕ	4	14'0"	
C23A	"	⅝"ϕ	10	8'10"	
C23B	"	⅝"ϕ	2	9'3"	
C23C	"	⅝"ϕ	2	10'1"	
C23D	"	⅝"ϕ	2	11'5"	
C23E	"	⅝"ϕ	2	12'1"	
C23F	"	⅝"ϕ	2	12'11"	
C23G	"	⅝"ϕ	2	13'7"	
C23H	"	⅝"ϕ	2	14'5"	
C23I	"	⅝"ϕ	2	15'3"	
C23J	"	⅝"ϕ	2	16'1"	
D2	"	½"ϕ	4	4'0"	
D3	"	1"ϕ	8	6'10"	
F6	Footing	½"ϕ	12	4'6"	
F7	"	½"ϕ	8	8'0"	
S2	Strut	½"ϕ	8	11'2"	
S1	"	½"ϕ	7	7'6"	

GENERAL NOTES

All concrete to be Class B
Class B concrete to be approx 1:2:4 mix, with not less than 5½ sacks of cement per cu yd of concrete.
Maximum aggregate - 1½ inches.
All rod dimensions are to centers of rods

MATERIAL FOR ONE BENT

H	Class B Concrete Cu Yds	Cement Sacks	Sand Cu Yds	Gravel Cu Yds	Reinf Steel Wt	Form Lumber 2"x6"-S4S | 1"x10" S1S1E	
15'	13.96	82	6.15	12.40	904#	46 pcs 16'	40 pcs 14'
16'	14.28	84	6.27	12.70	925#	30 - 16'	41 - 16'
17'	14.60	86	6.42	13.00	945#	32 - 16'	42 - 16'
18'	11.96	105	7.89	16.00	1125#	34 - 16'	43 - 16'
19'	18.28	107	8.03	16.25	1142#	48 - 18'	44 - 16'
20	18.60	109	8.17	16.50	1160#	50 - 18'	45 - 16'



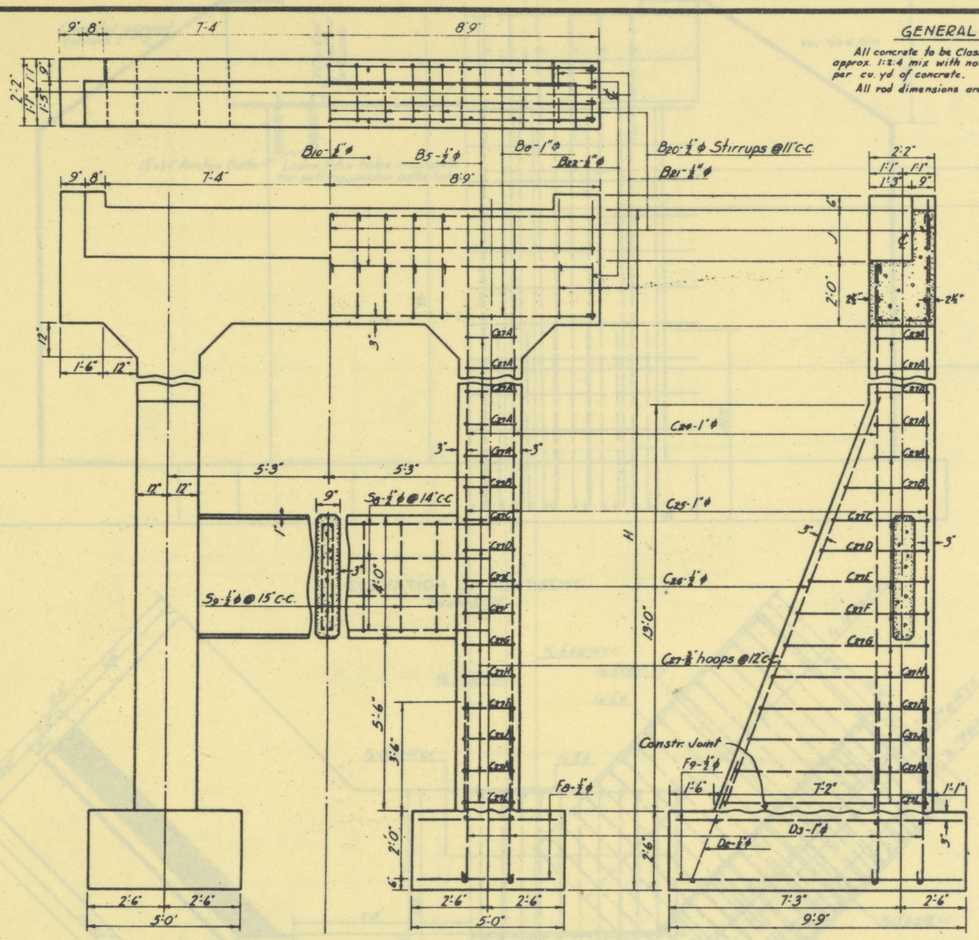
Size	D	L
½"ϕ	2½"	8"
1"ϕ	5"	16"

DESIGNED J.J.B.
CHECKED
TRACED
APPROVED
Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE END BENTS
HEIGHTS 15 TO 20 FT. INCL.
12 FOOT ROADWAY
JUNE 1934 Revised Sept 1934
SHEET 1 OF 1
DR. NO. 42

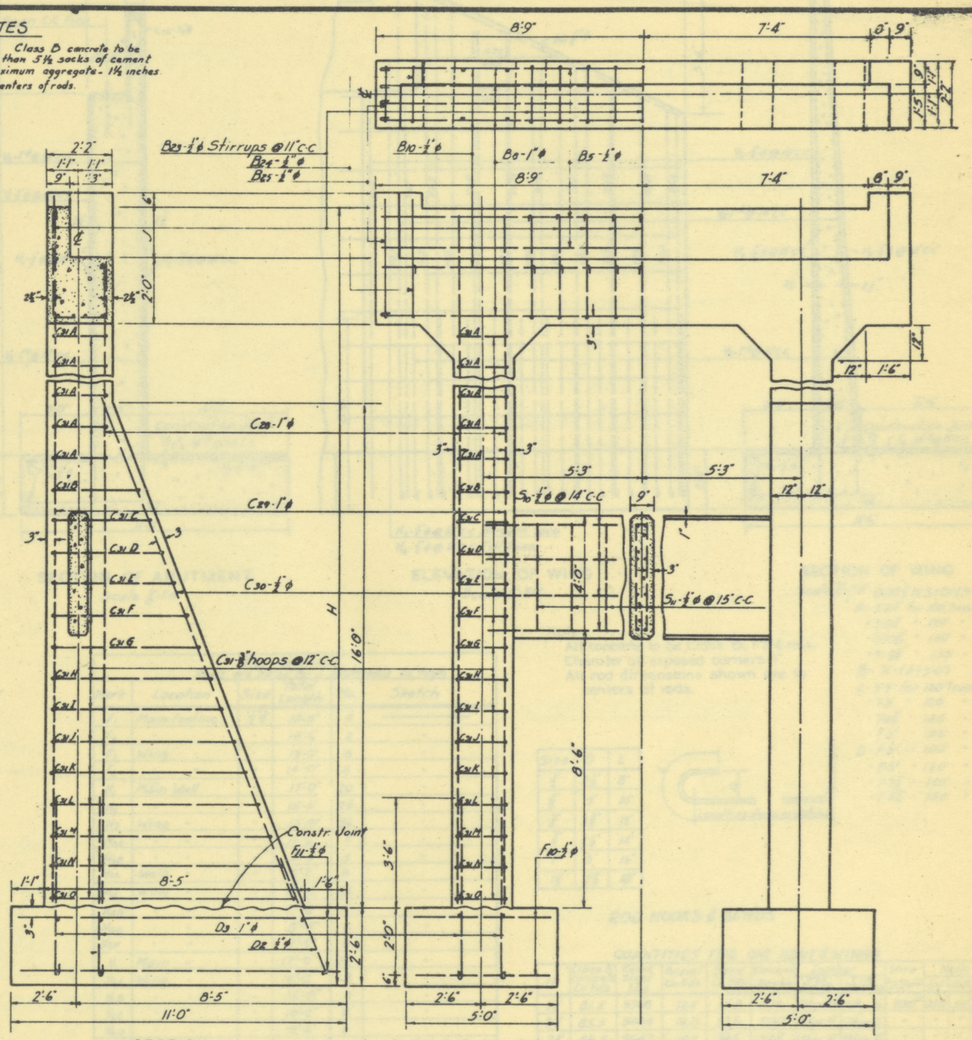
GENERAL NOTES

All concrete to be Class B. Class B concrete to be approx. 1:2:4 mix with not less than 5½ sacks of cement per cu. yd of concrete. Maximum aggregate - 1½ inches
All rod dimensions are to centers of rods.



PLAN & ELEVATION OF END BENT (H-21 TO 23 FT. INCL.)
Scale 1"=1'0"

SECTION



SECTION

PLAN & ELEVATION OF END BENT (H-24 TO 26 FT. INCL.)
Scale ½"=1'0"

ROD DETAILS FOR ONE BENT (H=23)

Mark	Location	Sketch	No.	Length	Weight
B0	Beam		2	9'-9"	19.5
B5	"		2	9'-5"	18.8
B10	"		2	12'-0"	24.0
B20	"		2	12'-0"	24.0
B21	"		2	12'-0"	24.0
B22	"		2	12'-0"	24.0
C28	Column		4	9'-5"	37.6
C25	"		10	12'-0"	120.0
C26	"		2	12'-0"	24.0
C27	"		2	12'-0"	24.0
C27A	"		2	12'-0"	24.0
C27B	"		2	12'-0"	24.0
C27C	"		2	12'-0"	24.0
C27D	"		2	12'-0"	24.0
C27E	"		2	12'-0"	24.0
C27F	"		2	12'-0"	24.0
C27G	"		2	12'-0"	24.0
C27H	"		2	12'-0"	24.0
C27I	"		2	12'-0"	24.0
C27J	"		2	12'-0"	24.0
C27K	"		2	12'-0"	24.0
C27L	"		2	12'-0"	24.0
D3	Footing		8	5'-6"	44.0
F9	"		8	5'-6"	44.0
S9	Strut		3	12'-0"	36.0
S11	"		3	12'-0"	36.0

ROD DETAILS FOR ONE BENT (H=26)

Mark	Location	Sketch	No.	Length	Weight
B0	Beam		2	9'-9"	19.5
B5	"		2	9'-5"	18.8
B10	"		2	12'-0"	24.0
B23	"		2	12'-0"	24.0
B24	"		2	12'-0"	24.0
B25	"		2	12'-0"	24.0
C29	Column		4	9'-5"	37.6
C30	"		10	12'-0"	120.0
C31	"		2	12'-0"	24.0
C31A	"		2	12'-0"	24.0
C31B	"		2	12'-0"	24.0
C31C	"		2	12'-0"	24.0
C31D	"		2	12'-0"	24.0
C31E	"		2	12'-0"	24.0
C31F	"		2	12'-0"	24.0
C31G	"		2	12'-0"	24.0
C31H	"		2	12'-0"	24.0
C31I	"		2	12'-0"	24.0
C31J	"		2	12'-0"	24.0
C31K	"		2	12'-0"	24.0
C31L	"		2	12'-0"	24.0
D3	Footing		8	5'-6"	44.0
F9	"		8	5'-6"	44.0
S9	Strut		3	12'-0"	36.0
S11	"		3	12'-0"	36.0

MATERIAL FOR ONE BENT

H	Class B Concrete Cu Yds	Cement Sacks	Sand Cu Yds	Gravel Cu Yds	Reinf Steel Lbs	Form Lumber 2"x6" S4S Ft.	Form Lumber 10"x10" Sh'g Ft.
21	21.4	125	9.4	13.0	1500	30 @ 14" 20 @ 16"	65 @ 16"
22	21.6	127	9.5	19.2	1544	22 @ 12" 20 @ 14"	67 @ 16"
23	21.8	128	9.6	19.4	1588	22 @ 12" 20 @ 14"	69 @ 16"
24	23.4	137	10.3	20.8	1689	30 @ 12" 20 @ 14"	72 @ 16"
25	23.6	138	10.4	21.0	1733	30 @ 12" 20 @ 14"	74 @ 16"
26	23.8	140	10.5	21.2	1772	120 @ 16"	78 @ 16"

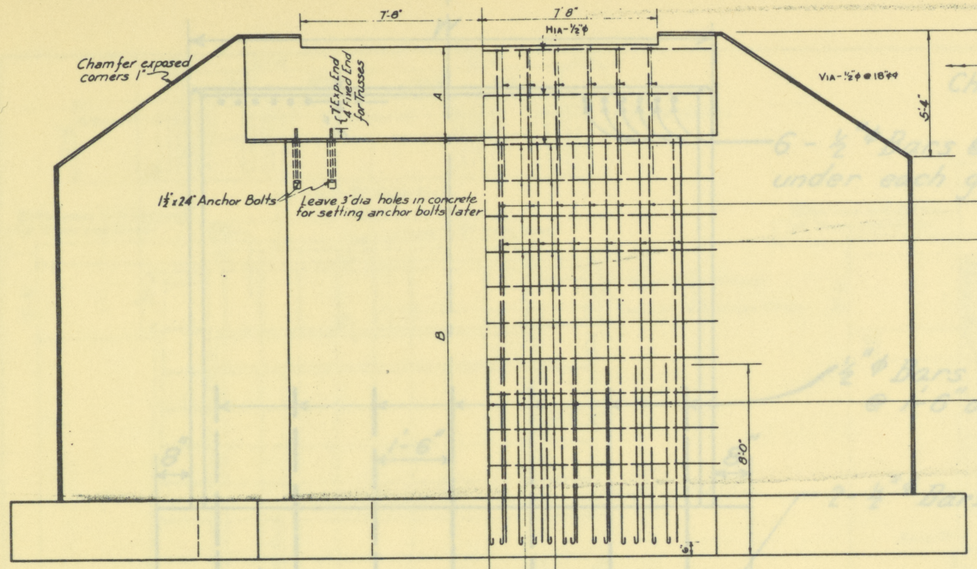
Size	D	L
½"ϕ	2½"	5"
1"ϕ	5	16"

DESIGNED J.J.B.
CHECKED J.J. Kell
TRACED P.F.M./W.H.
APPROVED P.F. Mahoney
Regional Engineer

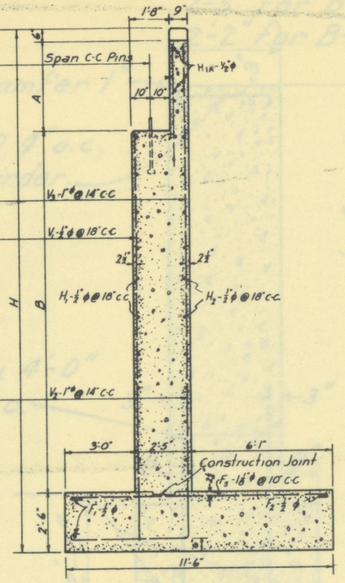
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE END BENTS
HEIGHTS 21 TO 26 FT. INCL.
12 FOOT ROADWAY

AUGUST 1934 SHEET 1 OF 1

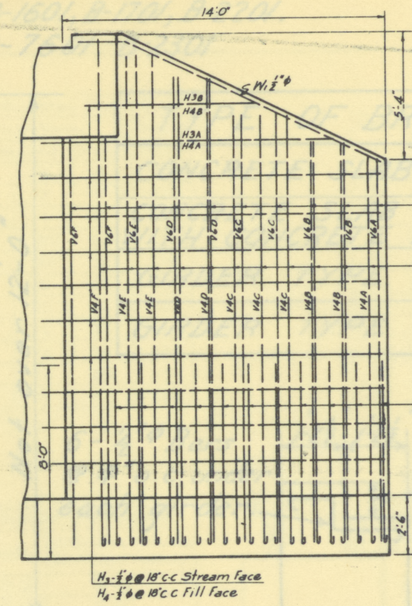
DR. NO. 30



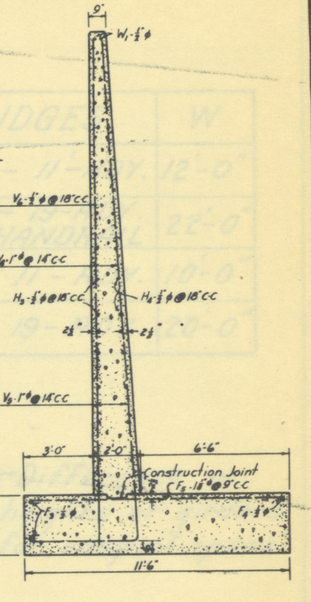
ELEVATION OF ABUTMENT
Scale ⅜"-1'-0"



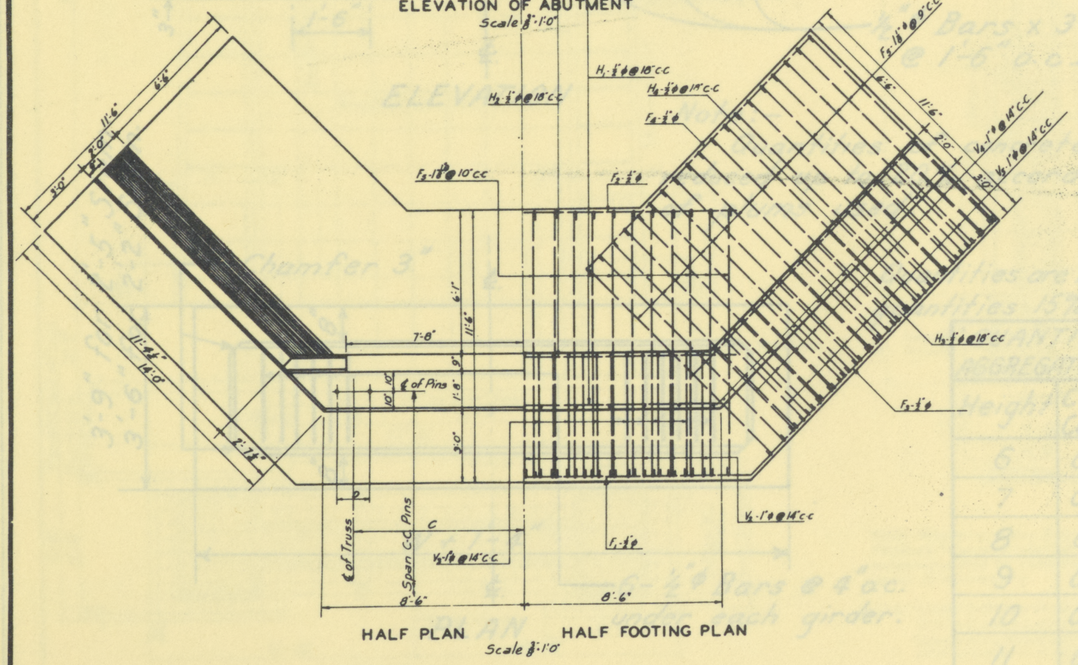
SECTION OF ABUTMENT
Scale ⅜"-1'-0"



ELEVATION OF WING
Scale ⅜"-1'-0"



SECTION OF WING
Scale ⅜"-1'-0"



HALF PLAN HALF FOOTING PLAN
Scale ⅜"-1'-0"

ROD DETAILS
Rods are listed for 2 abutments 22' high

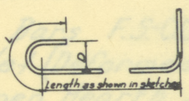
Mark	Location	Size	Total Length	No.	Sketch
F_1	Main Footing	⅝"ϕ	19'-8"	4	
F_2	" "	"	18'-6"	2	"
F_3	Wing "	"	15'-0"	8	"
F_4	" "	"	14'-0"	4	"
H_1	Main Wall	"	17'-0"	20	"
H_2	" "	"	19'-6"	24	"
H_3	Wing "	"	13'-10"	36	"
H_{3A}	" "	"	11'-6"	4	"
H_{3B}	" "	"	5'-9"	4	"
H_{1A}	Main "	"	15'-2"	6	
H_4	Wing "	"	13'-10"	36	"
H_{4A}	" "	"	11'-6"	4	"
H_{4B}	" "	"	8'-4"	4	"
V_{6F}	" "	"	17'-0"	8	
V_1	Main "	"	17'-0"	24	"
V_{4A}	Wing "	"	16'-0"	4	"
V_{4B}	" "	"	16'-8"	8	"
V_{4C}	" "	"	18'-2"	8	"
V_{4D}	" "	"	19'-6"	8	"
V_{4E}	" "	"	21'-0"	4	"
W_1	" "	"	14'-0"	8	"
V_2	Main "	1"ϕ	13'-7"	26	7'-6"
V_3	" "	"	26'-11"	24	20'-10"
V_{3A}	Wing "	"	21'-11"	4	16'-3"
V_{3B}	" "	"	22'-6"	8	16'-10"
V_{3C}	" "	"	23'-8"	12	18'-0"
V_{3D}	" "	"	25'-2"	8	19'-6"
V_{3E}	" "	"	26'-4"	8	20'-8"
V_{3F}	" "	"	27'-0"	4	21'-4"
V_5	" "	"	13'-2"	44	7'-6"
F_5	Footings	1⅛"ϕ	13'-1"	120	10'-1"
V_{1A}	Main Wall	½"ϕ	4'-0"	24	

Field Bend
4'-4"

Note: For H=23' or 24' increase lengths of all vertical bars accordingly.

Note:
All concrete to be Class "B", 1:2:4 mix.
Chamfer all exposed corners 1".
All rod dimensions shown are to centers of rods.

Size	D	L
⅜"	2¾"	8"
½"	3"	10"
⅝"	3¾"	12"
¾"	4½"	14"
1"	5"	16"
1⅛"	5¾"	18"



ROD HOOKS & BENDS

QUANTITIES FOR ONE ABUT & WINGS

H	Class B Concrete Cu Yds	Reinf. Steel Lbs.	Gravel Cu Yds	Sand Cu Yds	Cement Sacks	Lumber 2"x6" Rough	Lumber 5/4"x8" Shiplap	Wire #9 Soft	Nails 6d	Nails 10d	Nails 20d
22'	81.5	9308	72.5	35.9	476	160 pc 14'	148 pc 16'	200#	100	50	50
23'	85.5	9444	76.0	37.6	500	165 pc 14'	176 pc 16'	"	"	"	"
24'	89.5	9642	79.7	39.4	525	170 pc 14'	184 pc 16'	"	"	"	"

SECTION OF WING
Scale ⅜"-1'-0" DIMENSIONS

- A - 3'-9¼" for 100 Truss-12' Rdwy
  - 3'-9¼" " 120" " " "
  - 3'-10⅝" " 140" " " "
  - 3'-9⅞" " 150" " " "
- B - H-(A+3'-0")
- C - 7'-5" for 100 Truss-12' Rdwy
  - 7'-5" " 120" " " "
  - 7'-6⅜" " 140" " " "
  - 7'-5" " 150" " " "
- D - 1'-5" " 100" " " "
  - 1'-5" " 120" " " "
  - 1'-7⅜" " 140" " " "
  - 1'-5⅛" " 150" " " "

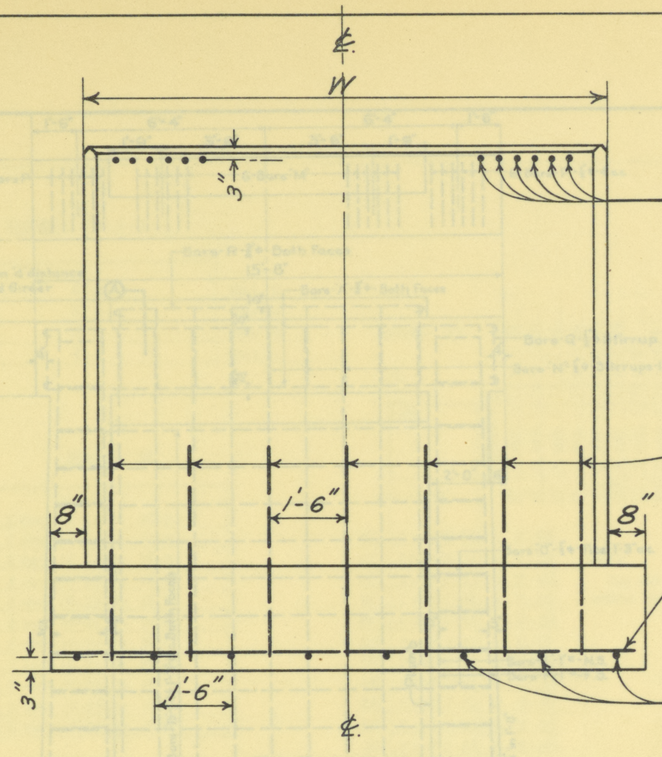
DESIGNED J.W.B.
CHECKED J.W.A. K.
TRACED C.F.C.
APPROVED Philip L. Hall Jr.
Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE ABUTMENTS
WITHOUT PILES
HEIGHTS 22' TO 24'
FOR
STEEL TRUSS BRIDGE
12 FOOT ROADWAY

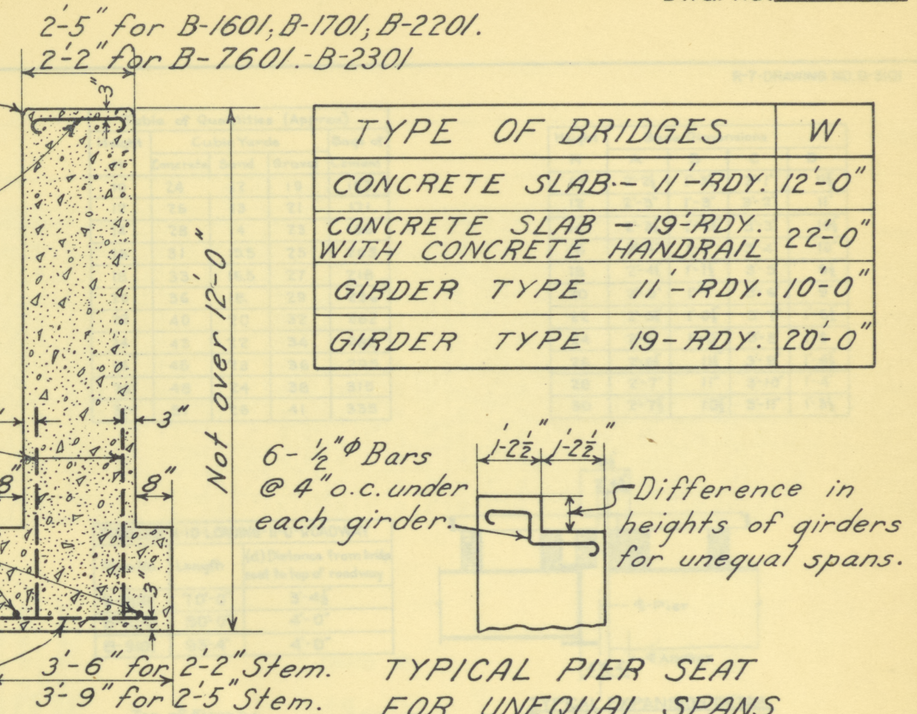
MAY 1934 SHEET 1 OF 1

DR. NO. 22

DWG. NO. B-2501-A



ELEVATION

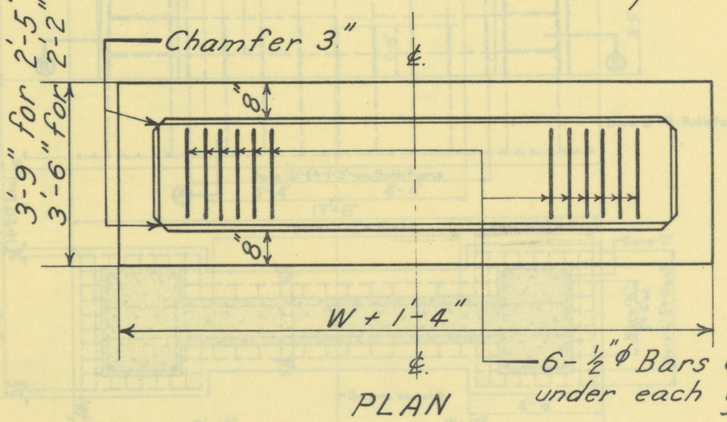


SECTION THRU ℄.

TYPE OF BRIDGES	W
CONCRETE SLAB - 11'-RDY.	12'-0"
CONCRETE SLAB - 19'-RDY. WITH CONCRETE HANDRAIL	22'-0"
GIRDER TYPE 11'-RDY.	10'-0"
GIRDER TYPE 19-RDY.	20'-0"

TYPICAL PIER SEAT FOR UNEQUAL SPANS

Note:-
Quantities of concrete aggregate will be reduced up to 20% according to the quantity of plums used.



PLAN

Quantities are for B-7601 & B-2301. Increase quantities 15% for B-1601; B-1701; B-2201.

QUANTITIES OF CONCRETE & AGGREGATES PER FT. WIDTH OF PIER				
Height	Cu. Yds. Concrete	Sacks Cement	Cu. Yds. Sand.	Cu. Yds. Stone
6	0.58	3.0	0.29	0.50
7	0.66	3.5	0.34	0.57
8	0.74	3.9	0.38	0.64
9	0.82	4.4	0.42	0.70
10	0.90	4.7	0.45	0.77
11	0.98	5.1	0.49	0.84
12	1.06	5.6	0.54	0.91

Specifications

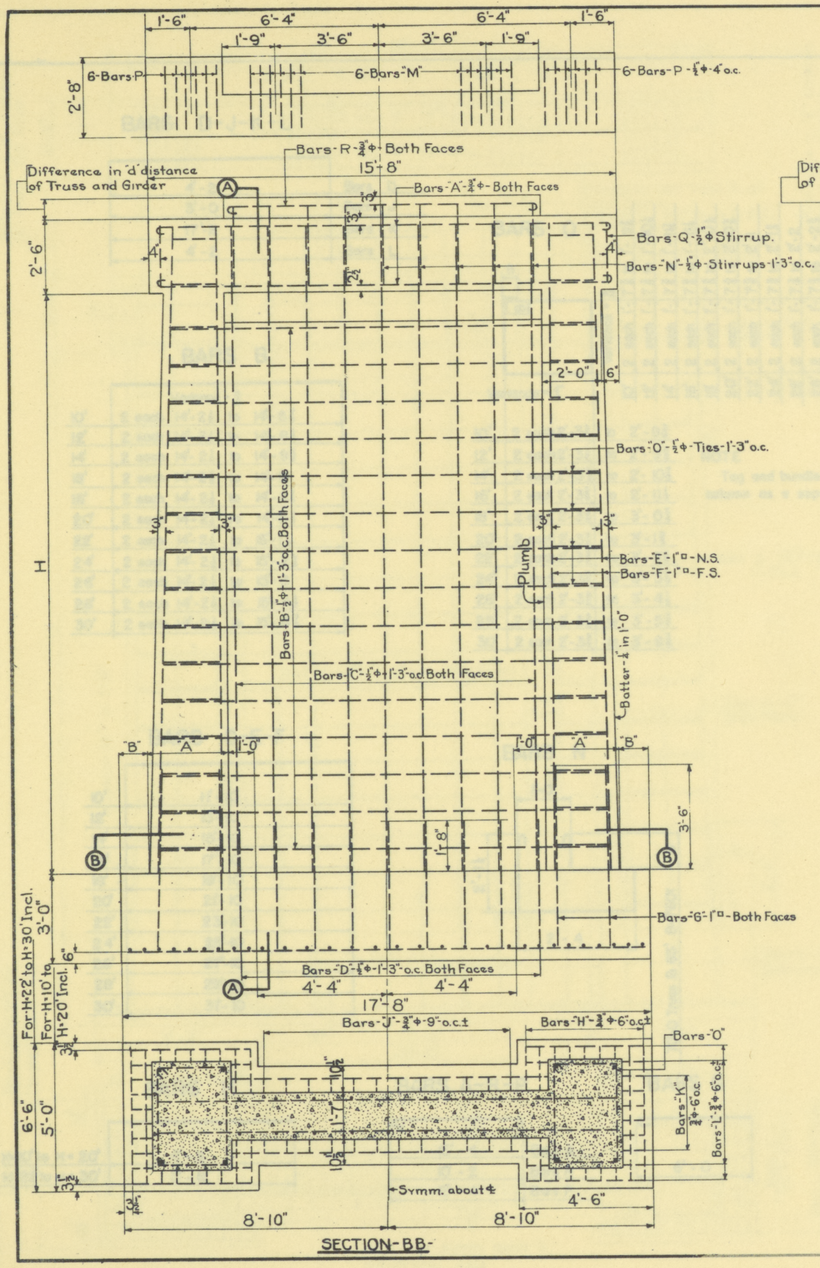
1 - Reinforcing Bars F.S.-Q.Q.-B-71 Type B-Grade 1 [Deformed-Structural] Class A or B (Open Hearth Steel.)
2 - Concrete - Class 'C'.

Design Data

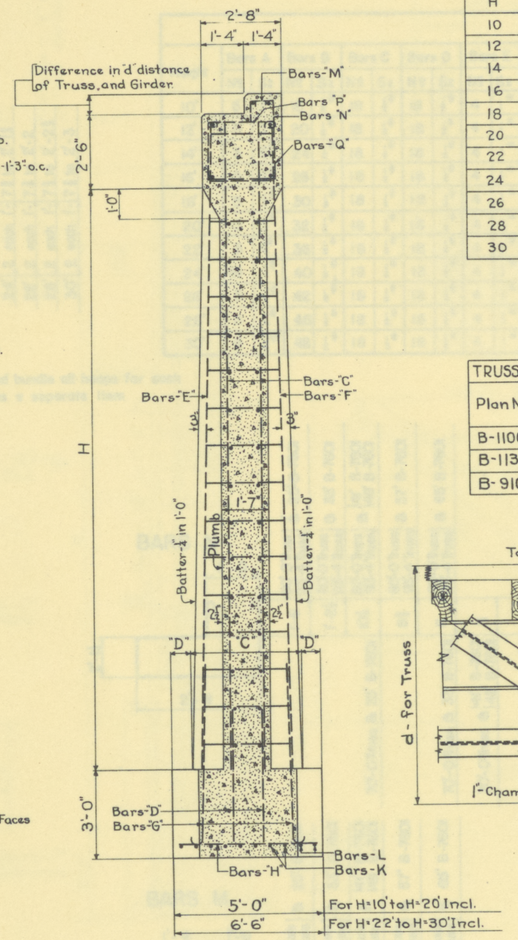
This Pier suitable for foundations of well compacted clay or gravel.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 7
MASS PIER
MAXIMUM HEIGHT 12-FT.

DESIGNED J.C.D. DRAWN D.B.
CHECKED R.E.P. & D.B. TRACED M.E.G.
SCALE ..... DATE April 1933
APPROVED [illegible] Regional Eng.
Revised 9-19-34 H.D.J.



SECTION-BB-



SECTION-AA-

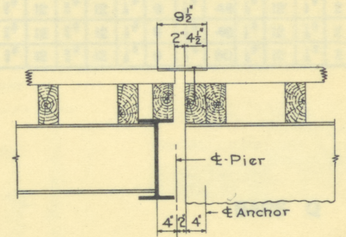
NOTE:- Masonry under Bearing Plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.

NOTE- Anchor bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

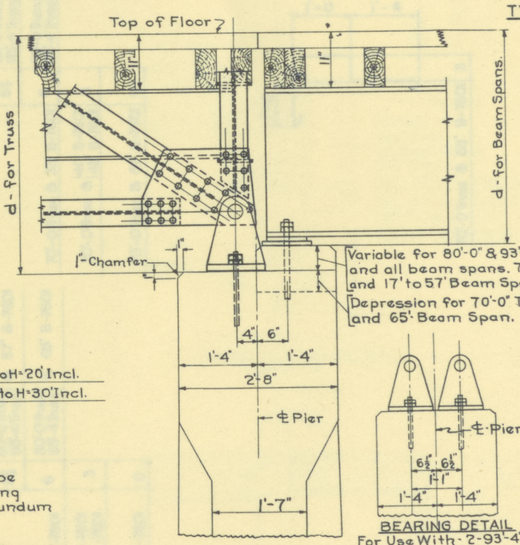
Table of Quantities (Approx)				
Height H	Cubic Yards			Bags of Cement
	Concrete	Sand	Gravel	
10	24	12	19	157
12	26	13	21	171
14	28	14	23	186
16	31	15.5	25	203
18	33	16.5	27	218
20	36	18.	29	236
22	40	20	32	262
24	43	22	34	282
26	45	23	36	295
28	48	24	38	315
30	51	26	41	335

TRUSSES-H-10-LOADING-11'-0"-ROADWAY		
Plan No.	Length	(d) Distance from bridge seat to top of roadway
B-11001	70'-0"	3'-4⅜"
B-11301	80'-0"	4'-0"
B-9101	93'-4"	4'-0"

Height H	Base Dimensions			
	A	B	C	D
10	2'-2½"	1'-3½"	3'-1"	11½"
12	2'-3"	1'-3"	3'-2"	11"
14	2'-3½"	1'-2½"	3'-3"	10½"
16	2'-4"	1'-2"	3'-4"	10"
18	2'-4½"	1'-1½"	3'-5"	9½"
20	2'-5"	1'-1"	3'-6"	9"
22	2'-5½"	1'-0½"	3'-7"	1'-5½"
24	2'-6"	1'-0"	3'-8"	1'-5
26	2'-6½"	11½"	3'-9"	1'-4½"
28	2'-7"	11"	3'-10"	1'-4"
30	2'-7½"	10½"	3'-11"	1'-3½"



TYPICAL EXPANSION DETAIL



TYPICAL BEARING DETAIL
Fixed Ends

BEARING DETAIL
For Use With - 2-93'-4" or 2-80'-0" or 1-80'-0" & 1-93'-4" Trusses

Rev. Feb. 3-1936. A.H.B. Anchor Bolt Note.
Rev. 7-19-35 To Show chamfer and Modification of Plan B-13001

Design Data

Wind Load 15#/s'
Traction ⅛ Live Load on Structure.
Temp. Thrust ⅜ Beam D.L. Reaction.
No Ice Pressure.
This Pier may be founded on impervious clay or well cemented gravel in thick natural beds.

Specifications

1-Reinforcing Bars - F.S.-QQ-B-71
Grade 1-Type-B-Deformed Structural
Class-A (Open hearth steel)
Hoop-Type A plain.
2-Concrete - Class A-1½

Chamfer all exposed edges 1".

For Bending Diagram See Dwg. No. B-3102.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REINFORCED CONCRETE PIER
FOR BEAM AND TRUSS BRIDGES
H-10 LOADING 11'-0" ROADWAY
DESIGNED 9-20-34 DRAWN L.T.S.
TRACED L.T.S. CHECKED C.C.J.
APPROVED [signature] Reg. Eng. AUG. 1934

BARS D-J-K-L

4'-2	Bars D
3'-0	Bars J
17'-2	Bars K
4'-2	Bars L

BARS B

Variance = 0	
10'	2 each 14'-2½ to 14'-6⅞
12'	2 each 14'-2½ to 14'-8⅛
14'	2 each 14'-2½ to 14'-9⅜
16'	2 each 14'-2½ to 14'-10
18'	2 each 14'-2½ to 14'-11¼
20'	2 each 14'-2½ to 14'-11⅞
22'	2 each 14'-2½ to 15'-1½
24'	2 each 14'-2½ to 15'-2⅛
26'	2 each 14'-2½ to 15'-3
28'	2 each 14'-2½ to 15'-4¼
30'	2 each 14'-2½ to 15'-4⅞

BARS C-E-F

10'	11'-10
12'	13'-10
14'	15'-10
16'	17'-10
18'	19'-10
20'	21'-10
22'	23'-10
24'	25'-10
26'	27'-10
28'	29'-10
30'	31'-10

BARS H

H=10' to H=20'	4'-8
H=22' to H=30'	5'-8

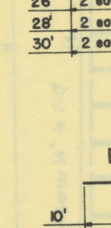
BARS O

Variance = 0	Variance = 1/8"										
	7⅞ to 1'-9⅞	7⅞ to 1'-10¼	7⅞ to 1'-10⅝	7⅞ to 1'-11	7⅞ to 1'-11⅜	7⅞ to 2'-0⅛	7⅞ to 2'-0⅝	7⅞ to 2'-1	7⅞ to 2'-1⅜	7⅞ to 2'-2	7⅞ to 2'-2⅝	7⅞ to 2'-3
10'	2 each 2'-3⅜											to 2'-8⅜
12'	2 each 2'-3⅜											to 2'-9⅝
14'	2 each 2'-3⅜											to 2'-10⅞
16'	2 each 2'-3⅜											to 2'-11½
18'	2 each 2'-3⅜											to 3'-0¾
20'	2 each 2'-3⅜											to 3'-1⅜
22'	2 each 2'-3⅜											to 3'-2⅝
24'	2 each 2'-3⅜											to 3'-3⅞
26'	2 each 2'-3⅜											to 3'-4½
28'	2 each 2'-3⅜											to 3'-5⅜
30'	2 each 2'-3⅜											to 3'-6⅜

NOTE

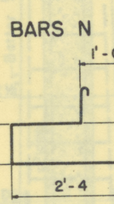
Tag and bundle all hoops for each column as a seperate item

BARS N



	80'-0 Truss & 25'-8-7601	80'-0 Truss & 33' B-7601	80'-0 Truss & 41' B-7601 & 49' B-7601	80'-0 Truss & 57' B-7601	80'-0 Truss & 65' B-7601
	1'-6	1'-2½	10½	8⅜	6
70'-0 Truss & 25' B-7601					
70'-0 Truss & 33' B-7601					3
70'-0 Truss & 41' B-7601 & 49' B-7601					3
70'-0 Truss & 57' B-7601					0

BARS M

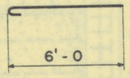


	80'-0 Truss & 25'-8-7601	80'-0 Truss & 33' B-7601	80'-0 Truss & 41' B-7601 & 49' B-7601	80'-0 Truss & 57' B-7601	80'-0 Truss & 65' B-7601
	1'-6	1'-2½	10½	8⅜	6
70'-0 Truss & 25' B-7601					
70'-0 Truss & 33' B-7601					3
70'-0 Truss & 41' B-7601 & 49' B-7601					3
70'-0 Truss & 57' B-7601					0

BARS A-R-P

15'-4	Bars A
10'-2	Bars R
2'-4	Bars P

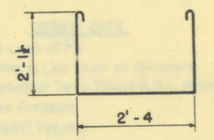
BARS G

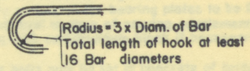


BARS REQUIRED

Height	Bars A		Bars B		Bars C		Bars D		Bars E		Bars F		Bars G		Bars H		Bars J		Bars K		Bars L		Bars M		Bars N		Bars O		Bars P		Bars Q		Bars R		Weight
	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	
10'	5	⅜	16	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	8	¾	12	½	9	½	18	½	12	½	2	½	2	¾	1690
12'	5	⅜	20	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	8	¾	12	½	9	½	22	½	12	½	2	½	2	¾	1840
14'	5	⅜	24	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	8	¾	12	½	9	½	26	½	12	½	2	½	2	¾	1980
16'	5	⅜	26	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	8	¾	12	½	9	½	28	½	12	½	2	½	2	¾	2090
18'	5	⅜	30	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	8	¾	12	½	9	½	32	½	12	½	2	½	2	¾	2240
20'	5	⅜	32	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	8	¾	12	½	9	½	34	½	12	½	2	½	2	¾	2350
22'	5	⅜	36	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	12	¾	12	½	9	½	38	½	12	½	2	½	2	¾	2490
24'	5	⅜	40	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	12	¾	12	½	9	½	42	½	12	½	2	½	2	¾	2640
26'	5	⅜	42	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	12	¾	12	½	9	½	44	½	12	½	2	½	2	¾	2720
28'	5	⅜	46	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	12	¾	12	½	9	½	48	½	12	½	2	½	2	¾	2900
30'	5	⅜	48	½	18	⅝	18	½	4	1	4	1	8	1	18	¾	12	¾	6	¾	12	¾	12	½	9	½	50	½	12	½	2	½	2	¾	3100

BARS Q





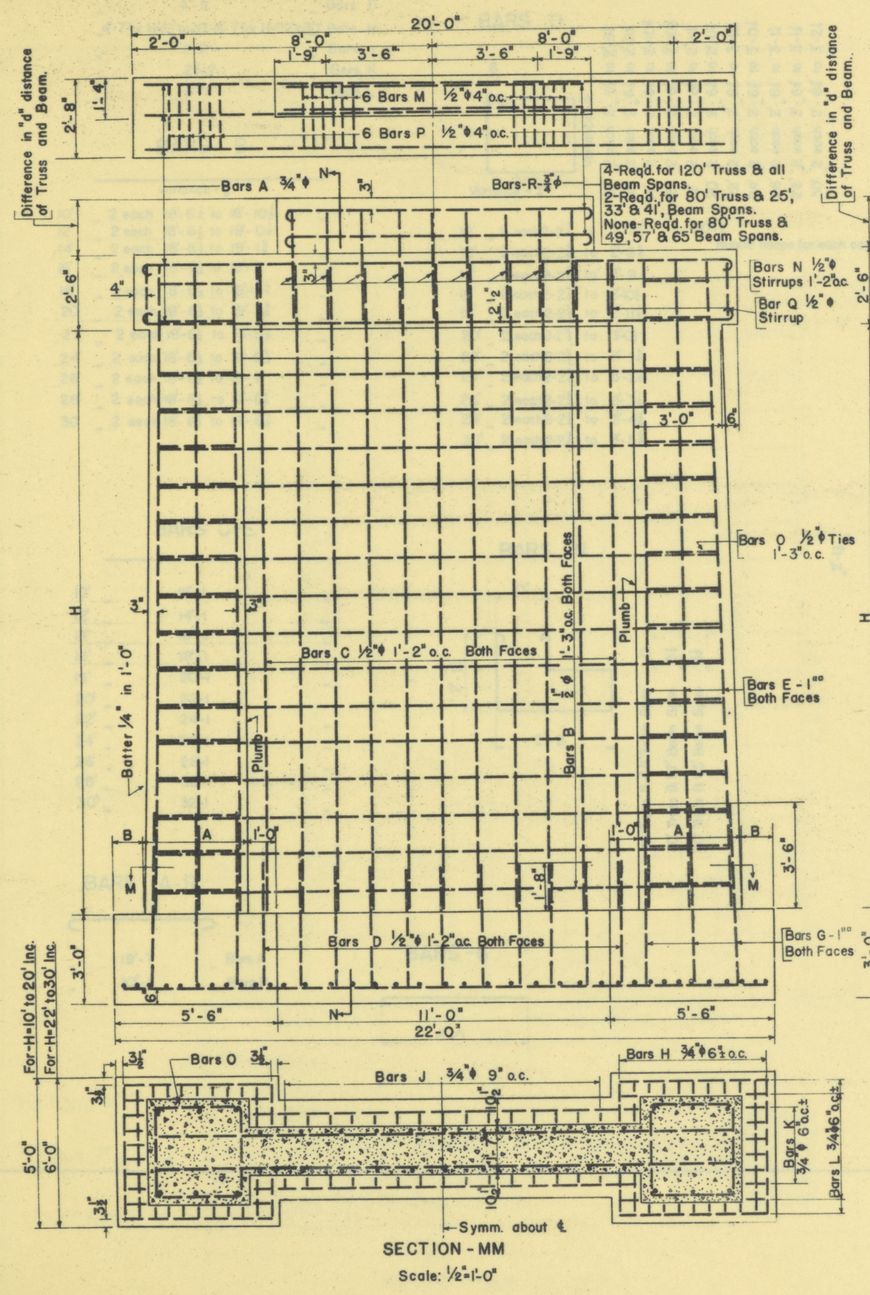
TYPICAL HOOK

NOTE

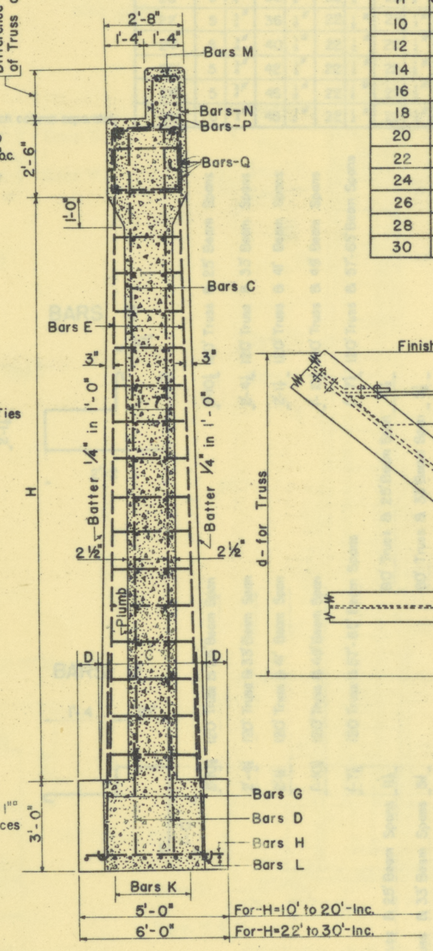
Lengths given are finished lengths
Shop to make proper allowance for bends

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
REINFORCED CONCRETE PIERS - DWG. NO. B-3101
FOR USE WITH
B-11001, B-11301 & B-9101 USED WITH DWG. B-7601

DESIGNED H.D.J. DRAWN H.D.J.
CHECKED [illegible] TRACED H.D.J.
RECOMMENDED FOR APPROVAL [illegible] DATE JUNE 1956
APPROVED [illegible] REGIONAL ENGINEER



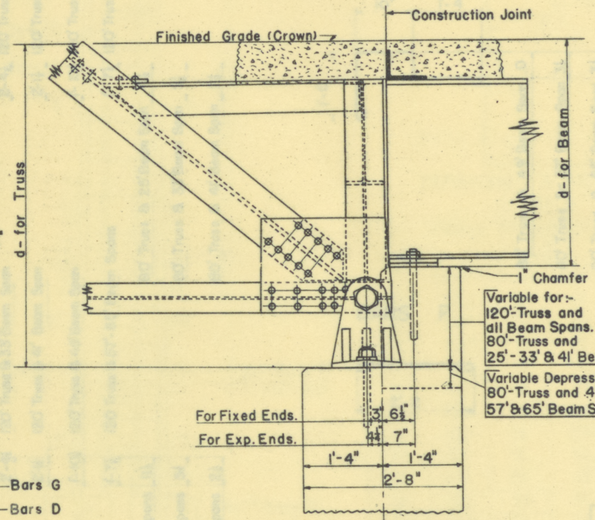
SECTION - MM
Scale: ½"=1'-0"



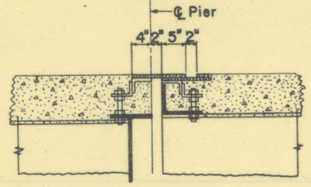
SECTION - NN
Scale: ½"=1'-0"

Table of Quantites (Approx.)				
Height H	Cubic Yards			Bags of Cement
	Concrete	Sand	Gravel	
10	31	16	25	204
12	34	17	27	223
14	37	19	30	243
16	40	20	32	262
18	43	22	34	282
20	46	23	37	302
22	51	26	41	335
24	54	27	43	354
26	58	29	46	380
28	61	31	49	400
30	65	33	52	426

Height H	Base Dimensions			
	A	B	C	D
10	3'-2½"	1'-3½"	3'-1"	11½"
12	3'-3"	1'-3"	3'-2"	11"
14	3'-3½"	1'-2½"	3'-3"	10½"
16	3'-4"	1'-2"	3'-4"	10"
18	3'-4½"	1'-1½"	3'-5"	9½"
20	3'-5"	1'-1"	3'-6"	9"
22	3'-5½"	1'-0½"	3'-7"	1'-2½"
24	3'-6"	1'-0"	3'-8"	1'-2"
26	3'-6½"	0'-11½"	3'-9"	1'-1½"
28	3'-7"	0'-11"	3'-10"	1'-1"
30	3'-7½"	0'-10½"	3'-11"	1'-0½"



TYPICAL BEARING DETAILS
Fixed Ends



EXPANSION END DETAILS

Truss H15 Loading 11'-0" Roadway			
Plan No.	Length	(d) Distance from bridge seat to crown of road	
		Concrete Deck	Timber Deck
B-1901	120'-0⅛"	5'-5⅛"	5'-10⅛"
B-8601	80'-0"	3'-7"	4'-0"

DESIGN DATA

Wind Load 15 ℔/s.f.
Traction 1/10 Live Load on Structure.
Longitudinal Temp. Thrust 3/10 D.L. Beam Reaction.
No Ice Pressure.
No Uplift Figured.
This pier suitable for foundations on Rock Only.

Specifications

1-Reinforcing Bars- F.S.-QQ-B 71-Grade 1-Type B-Deformed Structural Class A (Open hearth steel)
Hoop- Type A plain
2-Concrete-Class A-1½
Chamfer all exposed edges-1"
Masonry surface under bearing plates to be finished true and level at time of pouring, supplemented by rubbing with carborundum block if necessary.

Anchor bolts may be set in concrete of bridge seat at time of pouring with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

For Bending Diagram See Dwg. No. B-3104

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REINFORCED CONCRETE PIER
COMBINATION BEAM AND TRUSS BRIDGES
B-1601, B-8601 AND B-1901
H-15 LOADING 11'-0" ROADWAY

DESIGNED W.W.W. DRAWN K.E.A.
CHECKED C.C.J. TRACED K.E.A. C.C.J.
RECOMMENDED FOR APPROVAL E.A.M. DATE July 1935
APPROVED [signature] REGIONAL FORESTER

REV. FEB. 3-1936. C.C.J.
REV. SEPT. 27-1935

BARS D-H-J-K-L

4'-2	Bars D
4'-7 for H=10' to 20' - 5'-7 for H=22' to 30'	Bars H
2'-11	Bars J
21'-7	Bars K
5'-1	Bars L

BARS B

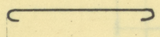
variance = 5/8

10'	2 each 18'-6½ to 18'-10⅝
12'	2 each 18'-6½ to 19'-0⅛
14'	2 each 18'-6½ to 19'-1⅝
16'	2 each 18'-6½ to 19'-2
18'	2 each 18'-6½ to 19'-3¼
20'	2 each 18'-6½ to 19'-3⅞
22'	2 each 18'-6½ to 19'-5⅛
24'	2 each 18'-6½ to 19'-6⅜
26'	2 each 18'-6½ to 19'-7
28'	2 each 18'-6½ to 19'-8¼
30'	2 each 18'-6½ to 19'-8⅞

BARS C-E

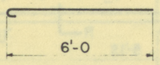
10'	12'-1
12'	14'-1
14'	16'-1
16'	18'-1
18'	20'-1
20'	22'-1
22'	24'-1
24'	26'-1
26'	28'-1
28'	30'-1
30'	32'-1

BARS A-R

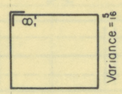


19'-7	Bars A
10'-1	Bars R

BARS G



BARS O



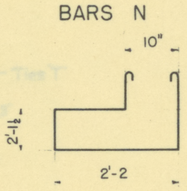
Variance = 1/8

10'	2 each 2'-6⅝	to	2'-9⅛	12'	2 each 2'-6⅝	to	2'-9⅛	14'	2 each 2'-6⅝	to	2'-10⅜
16'	2 each 2'-6⅝	to	2'-10⅜	18'	2 each 2'-6⅝	to	2'-11⅝	20'	2 each 2'-6⅝	to	3'-0¼
22'	2 each 2'-6⅝	to	3'-0¼	24'	2 each 2'-6⅝	to	3'-0⅞	26'	2 each 2'-6⅝	to	3'-1¼
28'	2 each 2'-6⅝	to	3'-1⅞	30'	2 each 2'-6⅝	to	3'-2⅝				

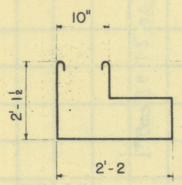
10'	2 each 2-2⅜	to	2'-7⅜
12'	2 each 2-2⅜	to	2'-8⅝
14'	2 each 2-2⅜	to	2'-9⅞
16'	2 each 2-2⅜	to	2'-10½
18'	2 each 2-2⅜	to	2'-11¾
20'	2 each 2-2⅜	to	3'-0⅞
22'	2 each 2-2⅜	to	3'-1⅞
24'	2 each 2-2⅜	to	3'-2⅝
26'	2 each 2-2⅜	to	3'-3½
28'	2 each 2-2⅜	to	3'-4⅜
30'	2 each 2-2⅜	to	3'-5⅜

NOTE
Bundle hoops for each column separately

BARS N

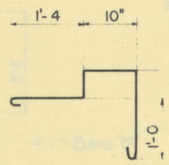


BARS N



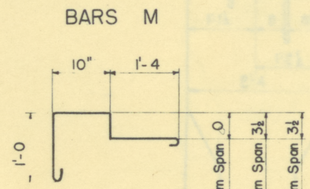
80' Truss & 49' Beam Span	0	3½	3½	80' Truss & 57' Beam Span	0	3½	3½	80' Truss & 65' Beam Span	0	3½	3½	120' Truss & 25' Beam Spans	2'-10½	2'-4½	2'-11½	120' Truss & 33' Beam Spans	2'-4½	2'-11½	1'-10½	120' Truss & 41' Beam Spans	2'-11½	1'-10½	1'-7½
120' Truss & 49' Beam Spans	1'-7½	11½	5½	120' Truss & 57'-65' Beam Spans	11½	5½	2½																

BARS M



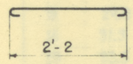
120' Truss & 25' Beam Span	2'-10½	2'-4½	2'-11½	120' Truss & 33' Beam Span	2'-4½	2'-11½	1'-10½	120' Truss & 41' Beam Span	2'-11½	1'-10½	1'-7½	120' Truss & 49' Beam Span	1'-7½	11½	5½	120' Truss & 57'-65' Beam Spans	11½	5½	2½				
80' Truss & 25' Beam Spans	11½	5½	2½	80' Truss & 33' Beam Spans	5½	2½		80' Truss & 41' Beam Spans	2½														

BARS M

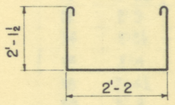


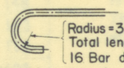
80' Truss & 49' Beam Span	0	3½	3½
80' Truss & 57' Beam Span	0	3½	3½
80' Truss & 65' Beam Span	0	3½	3½

BARS P



BARS Q





Radius = 3 x Diam. of Bar
Total length of hook at least
16 Bar diameters
Dimensions shown for other lengths are out to out.

TYPICAL HOOK

NOTE
Lengths given are finished lengths. Shop to make proper allowance for bends

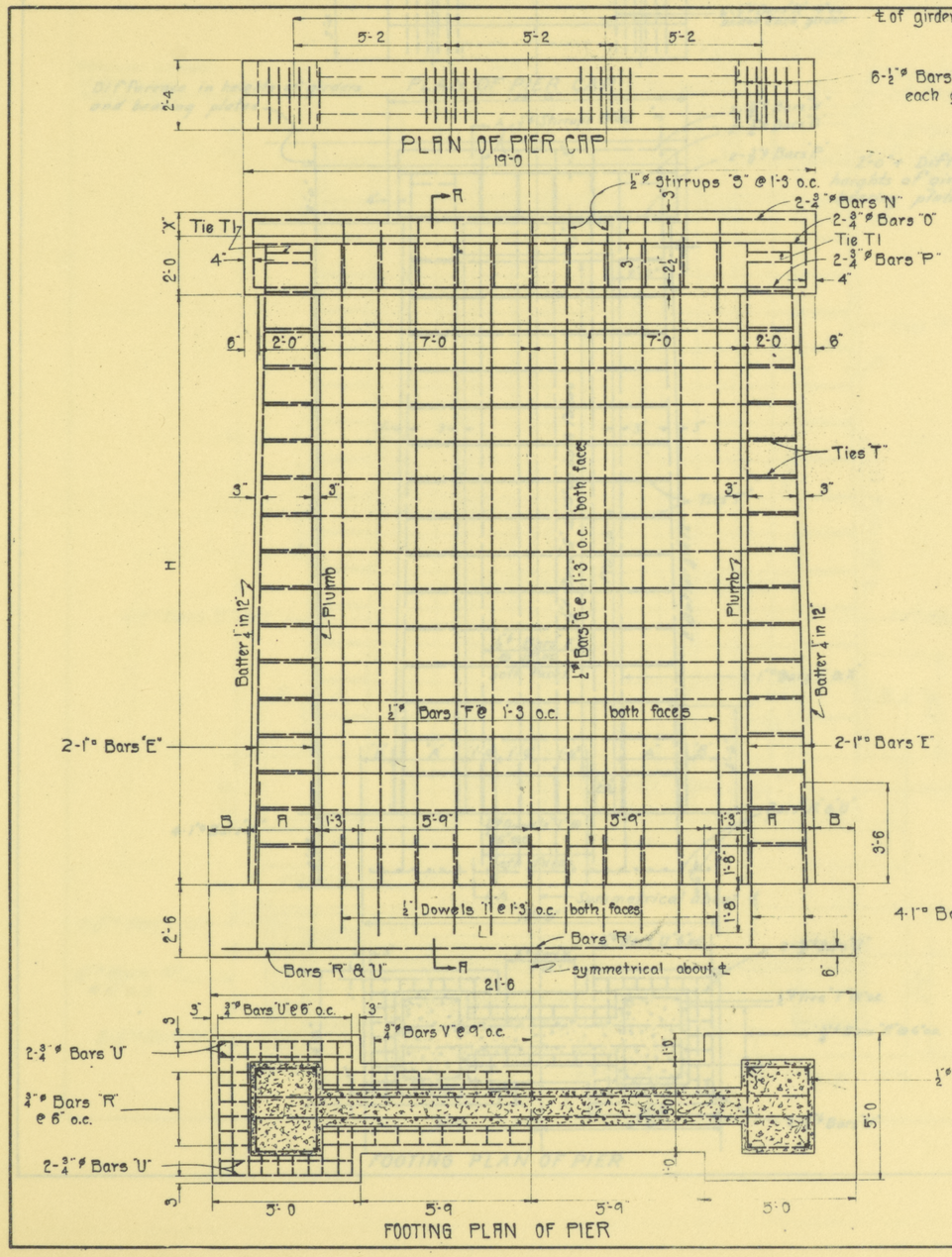
BARS REQUIRED

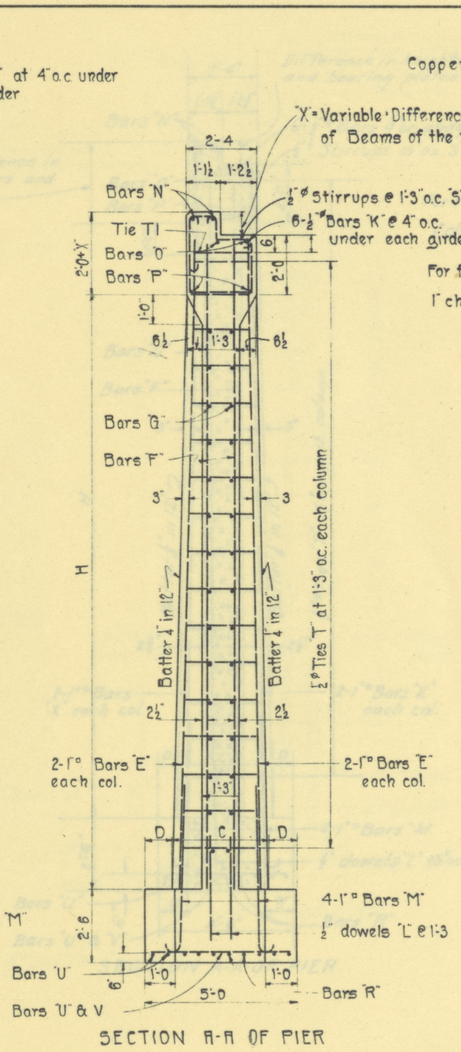
Height	Bars A		Bars B		Bars C		Bars D		Bars E		Bars R		Bars G		Bars H		Bars J		Bars K		Bars L		Bars M		Bars N		Bars O		Bars P		Bars Q		Weight
	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	Nº	Sz	
10'	5	¾"	16	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	8	¾"	12	½"	9	½"	18	½"	12	½"	4	½"	2200
12'	5	¾"	20	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	8	¾"	12	½"	9	½"	22	½"	12	½"	4	½"	2400
14'	5	¾"	24	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	8	¾"	12	½"	9	½"	26	½"	12	½"	4	½"	2600
16'	5	¾"	26	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	8	¾"	12	½"	9	½"	28	½"	12	½"	4	½"	2750
18'	5	¾"	30	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	8	¾"	12	½"	9	½"	32	½"	12	½"	4	½"	2950
20'	5	¾"	32	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	8	¾"	12	½"	9	½"	34	½"	12	½"	4	½"	3100
22'	5	¾"	36	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	12	¾"	12	½"	9	½"	38	½"	12	½"	4	½"	3400
24'	5	¾"	40	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	12	¾"	12	½"	9	½"	42	½"	12	½"	4	½"	3600
26'	5	¾"	42	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	12	¾"	12	½"	9	½"	44	½"	12	½"	4	½"	3750
28'	5	¾"	46	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	12	¾"	12	½"	9	½"	48	½"	12	½"	4	½"	3950
30'	5	¾"	48	½"	22	½"	22	½"	12	1"	1	¾"	12	1"	22	¾"	15	¾"	6	¾"	12	¾"	12	½"	9	½"	50	½"	12	½"	4	½"	4100

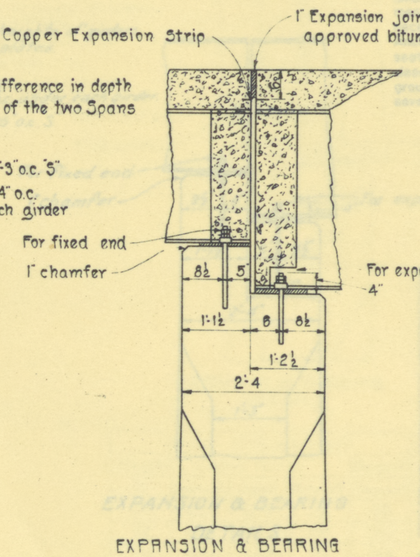
4-Req'd for 120' Truss & all Beam Spans
2-Req'd for 80' Truss & 25'-33'-41' Beam Spans
0-Req'd for 80' Truss & 49'-57'-65' Beam Spans

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
BENDING DIAGRAM
REINFORCED CONCRETE PIERS - DWG. NO. B-3103
FOR USE WITH
DWGS. B-1901 & B-8601. USED WITH DWG. B-1601

DESIGNED
CHECKED
RECOMMENDED FOR APPROVAL
DRAWN H.D.J.
TRACED H.D.J.
DATE MAY 1935
APPROVED
REGIONAL ENGINEER







EXPANSION & BEARING DETAILS

TABLE OF QUANTITIES

Height H	Cubic Yards Concrete	Sand	Stone	Bags of Cement
10	22.2	11	18	148
12	24.5	12	20	163
14	26.7	13	21	178
16	29.0	15	23	193
18	31.3	16	25	206
20	33.5	17	27	223
22	35.7	18	29	239
24	38.0	19	31	254
26	40.3	20	33	269
28	42.9	22	35	284
30	45.6	23	37	309

Quantities include cap and footings

Height H	Base Dimensions A	B	C	D
10	2'-2½	1'-6½	2'-9	1'-1½
12	2'-3	1'-6	2'-10	1'-1
14	2'-3½	1'-5½	2'-11	1'-0½
16	2'-4	1'-5	3'-0	1'-0
18	2'-4½	1'-4½	3'-1	11½
20	2'-5	1'-4	3'-2	11
22	2'-5½	1'-3½	3'-3	10½
24	2'-6	1'-3	3'-4	10
26	2'-6½	1'-2½	3'-5	9½
28	2'-7	1'-2	3'-6	9
30	2'-7½	1'-1½	3'-7	8½

Design Data

f_s = 16000 ℔/sq. in. net area
f_c = 650 ℔/sq. in. n = 15
This pier suitable for foundations of well compacted clay or gravel.

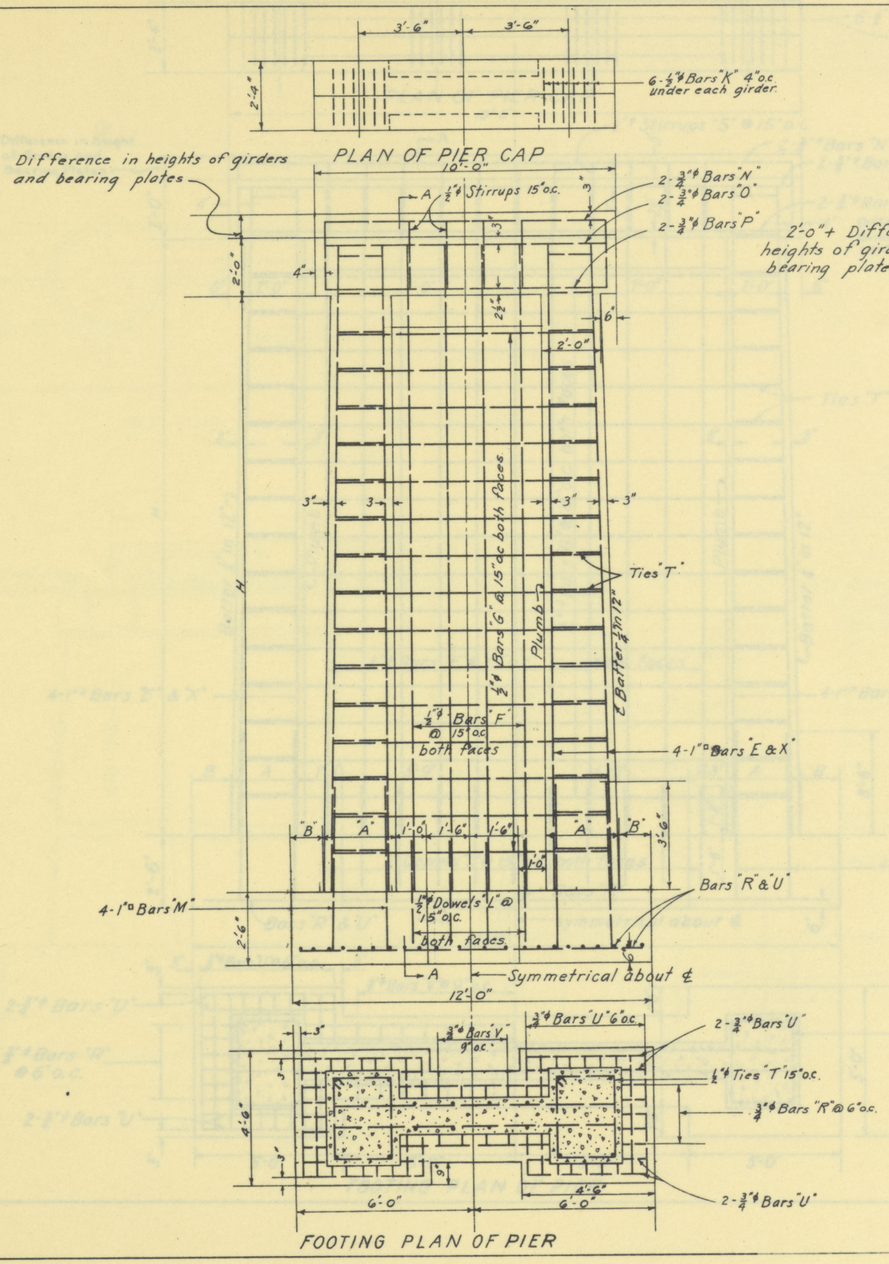
Specifications

1. Reinforcing steel shall conform to F.S. QQ-B-71, Type B-Grade 1 (Deformed Structural) Class A (Open Hearth Steel) Hoops - Type A plain
2. Concrete - Class A-1½ Mix 1:2:3½ by Volume

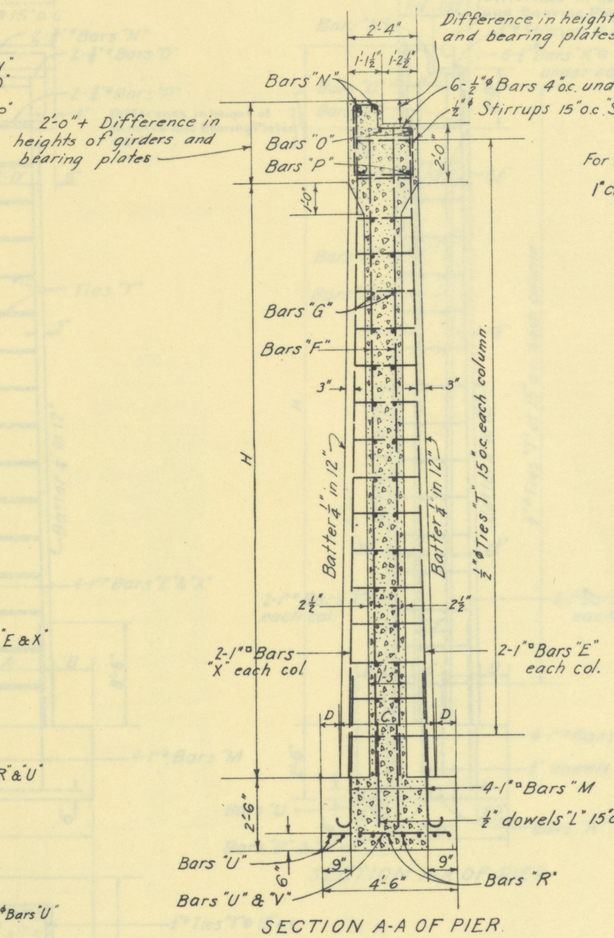
H 15 Loading
For Bending Diagram see Dwg. B9202

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-7
REINFORCED CONCRETE PIER
For use with Dwgs. B 1701 & B 2201
Designed & Checked:- D.B. & R.E.P.
Drawn:- D.B. Traced:- G.B.H.
Approved _____ Date:- April 1933
Asst. Regional Engineer
Modified from design by Arkansas State Highway Dept.

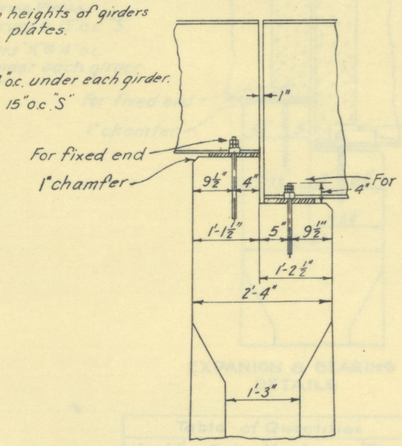
DWG. NO. B 13001



FOOTING PLAN OF PIER



SECTION A-A OF PIER.



EXPANSION & BEARING DETAILS.

Note :-
Masonry surfaces under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.
Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

Height	Base Dimensions			
H	A	B	C	D
12	2'-3"	1'-3"	2'-10"	10"
14	2'-3½"	1'-2½"	2'-11"	9½"
16	2'-4"	1'-2"	3'-0"	9"
18	2'-4½"	1'-1½"	3'-1"	8½"
20	2'-5"	1'-1"	3'-2"	8"
22	2'-5½"	1'-0½"	3'-3"	7½"
24	2'-6"	1'-0"	3'-4"	7"
26	2'-6½"	0'-11½"	3'-5"	6½"
28	2'-7"	0'-11"	3'-6"	6"
30	2'-7½"	0'-10½"	3'-7"	5½"

Table of Quantities (Approx)

Height	Cubic Yards			Bags of
H	Concrete	Sand	Gravel	Cement
12	14.2	8.0	12.0	97
14	15.8	8.5	13.0	108
16	17.3	9.0	14.5	119
18	18.8	10.0	16.0	130
20	20.4	11.0	17.5	140
22	22.1	12.0	19.0	151
24	23.7	13.0	20.0	162
26	25.3	14.0	21.5	174
28	26.9	15.0	23.5	185
30	28.5	16.0	24.5	196

Quantities Include Cap And Footing.

f_s = 16,000 #/sq. in.
f_c = 650 #/sq. in. N = 15
This pier suitable for foundations of well compacted clay or gravel.

Specifications

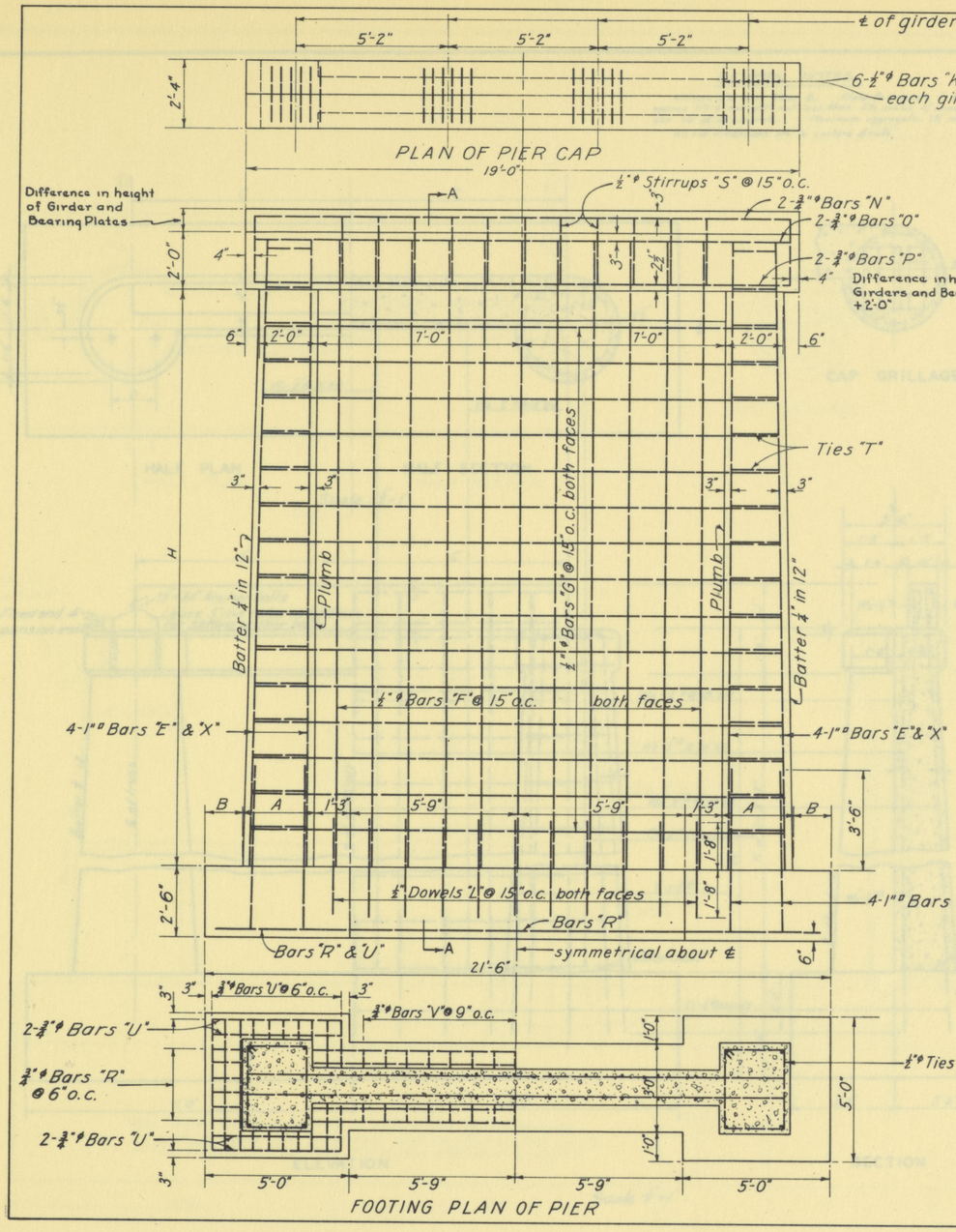
1-Reinforcing Bars - F.S.-90-B-71
Grade I, Type B (Deformed Structual)
Class (a) (open hearth steel)
Hoop - Type A plain.
2-Concrete - Class A-1½
Chamfer all exposed edges 1"

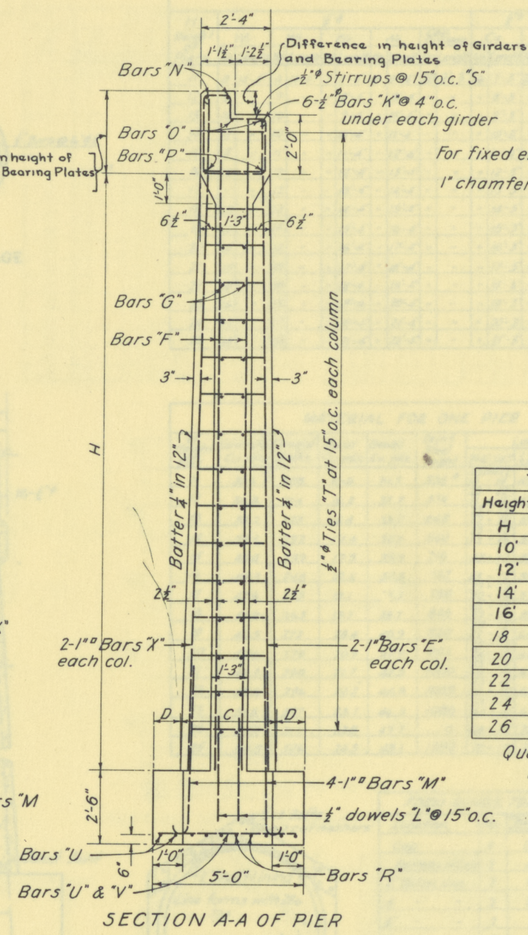
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 7
REINFORCED CONCRETE PIER
FOR DRAWING B-7601.

DESIGNED & CHECKED D.B. & W.I.D.
DRAWN D.B. & W.I.D. TRACED W.I.D.
APPROVED [illegible] Regional Engineer. DATE NOV. 1933

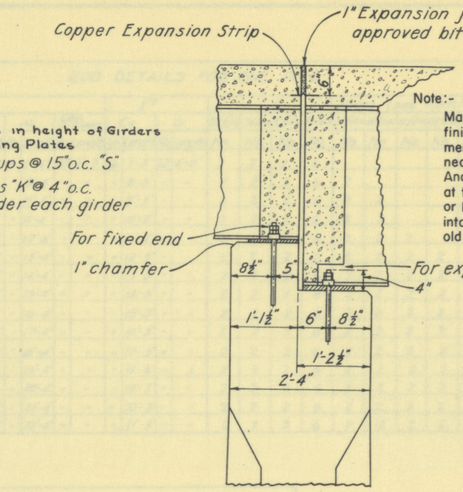
Revised 2-3-1936 Notes added, Specifications revised. C.C.J.
Revised-July 25, 1934-L.T.S.

DWG. NO. B-13401





SECTION A-A OF PIER



EXPANION & BEARING DETAILS

Note:-
Masonry surfaces under bearing plates to be finished true and level at time of pouring supplemented by rubbing with carborundum block if necessary.
Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

Height	Base Dimensions			
H	A	B	C	D
10'	2'-2½"	1'-6½"	2'-9"	1'-1½"
12'	2'-3"	1'-6"	2'-10"	1'-1"
14'	2'-3½"	1'-5½"	2'-11"	1'-0½"
16'	2'-4"	1'-5"	3'-0	1'-0"
18'	2'-4½"	1'-4½"	3'-1"	11½"
20'	2'-5"	1'-4"	3'-2"	11"
22'	2'-5½"	1'-3½"	3'-3"	10½"
24'	2'-6"	1'-3"	3'-4"	10"
26'	2'-6½"	1'-2½"	3'-5"	9½"

Table of Quantities

Height	Cubic Yards			Bags of
H	Concrete	Sand	Gravel	Cement
10'	23.1	11.6	18	159
12'	25.1	12.7	20	172
14'	27.1	13.8	22	186
16'	29.2	14.9	24	200
18	31.3	16.0	26	215
20	33.5	17.1	28	231
22	35.7	18.3	30	247
24	38.0	19.5	32	263
26	40.3	20.8	34	280

Quantities include cap and footings.

Design Data

f_s = 16000#/sq. in.
f_c = 650#/sq. in. N=15
This pier suitable for foundations of well compacted clay or gravel.

Specifications

1- Reinforcing Bars - F.S.Q.Q - B-71
Grade 1, Type B (Deformed Structual)
Class (a) (open hearth steel)
Hoop - Type A plain
2- Concrete - Class A-1½

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-7
REINFORCED CONCRETE PIER
FOR DRAWINGS B-2201 B-1701

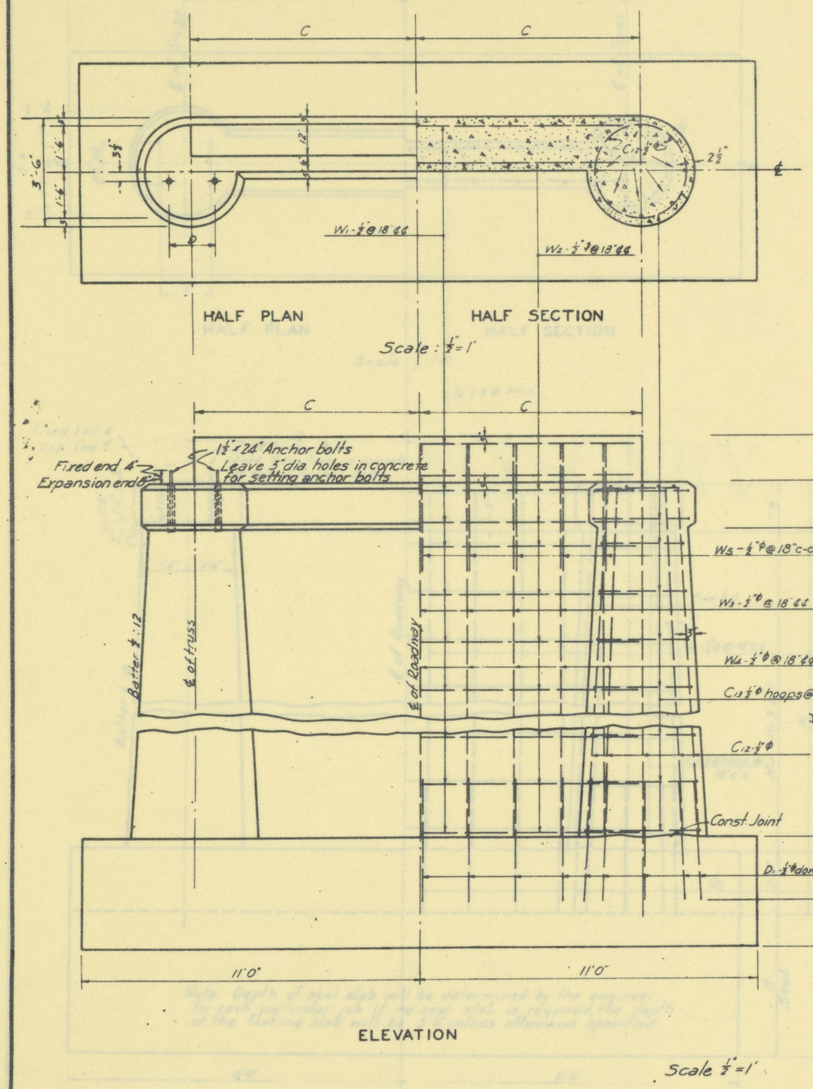
DESIGNED & CHECKED D.B & R.E.P
DRAWN D.B TRACED G.B.H.
APPROVED _____ DATE APRIL 1933
Regional Engineer Revised June 1934 - L.T.S.

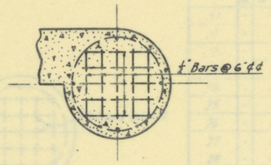
Revised 2-3-1936 Notes added, Specifications revised. C.C.J. Modified from design by Arkansas State Highway Dept.

GENERAL NOTES

All concrete to be Class B. Class B concrete to be approx 1:2:4 mix with not less than 5½ sacks of cement per cu yd of concrete. Maximum aggregate - 1½ inches

All rod dimensions are to centers of rods.





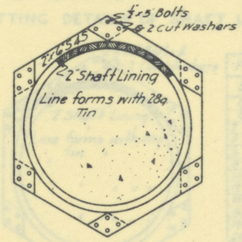
CAP GRILLAGE

ROD DETAILS FOR ONE PIER

H Height of Piers	½"ϕ W1 No	W1 Length	½"ϕ W2 No	W2 Length	W3 No	W3 Length	W4 No	W4 Length	Cap Grillage No	Cap Grillage Length	½"ϕ C12 No	C12 Length	½"ϕ D1 No	D1 Length	C13 - ½"ϕ Hoops (see sketch below) 32 ½"dia No	34 ½"dia No.	35 ½"dia No.	37 ½"dia No.	38 ½"dia No.	40 ½"dia No.	41 ½"dia No.	43 ½"dia No.	45 ½"dia No.	46 ½"dia No.	47 ½"dia No.	49 ½"dia No.	50 ½"dia No.	52 ½"dia No.	½"ϕ W5 No	W5 Length
11	8	14'-6"	8	14'-4"	7	7'-6"	9	8'-4"	20	2'-3"	16	7'-3"	32	4'-0"	2	2	2	6											9	4'-0"
12	9	"	9	"	"	8'-4"	"	9'-4"	"	"	"	8'-3"	"	"	2	2	2	6	2										-	"
13	10	"	10	"	"	9'-4"	"	10'-4"	"	"	"	9'-3"	"	"	2	2	2	6	2	2									-	"
14	10	"	10	"	"	10'-4"	"	11'-4"	"	"	"	10'-3"	"	"	2	2	2	6	2	2									-	"
15	11	"	11	"	"	11'-4"	"	12'-4"	"	"	"	11'-3"	"	"	2	2	2	6	2	2	2								-	"
16	12	"	12	"	"	12'-4"	"	13'-4"	"	"	"	12'-3"	"	"	2	2	2	6	2	2	2	2							-	"
17	"	"	12	"	"	13'-4"	"	14'-4"	"	"	"	13'-3"	"	"	2	2	2	6	2	2	2	2							-	"
18	13	"	13	"	"	14'-4"	"	15'-4"	"	"	"	14'-3"	"	"	2	2	2	6	2	2	2	2	2						-	"
19	14	"	14	"	"	15'-3"	"	16'-4"	"	"	"	15'-3"	"	"	2	2	2	6	2	2	2	2	2	2					-	"
20	14	"	14	"	"	16'-4"	"	17'-4"	"	"	"	16'-3"	"	"	2	2	2	6	2	2	2	2	2	2					-	"
21	15	"	15	"	"	17'-4"	"	18'-4"	"	"	"	17'-3"	"	"	2	2	2	6	2	2	2	2	2	2	2				-	"
22	16	"	16	"	"	18'-4"	"	19'-4"	"	"	"	18'-3"	"	"	2	2	2	6	2	2	2	2	2	2	2	2			-	"
23	16	"	16	"	"	19'-4"	"	20'-4"	"	"	"	19'-3"	"	"	2	2	2	6	2	2	2	2	2	2	2	2			-	"
24	17	"	17	"	"	20'-4"	"	21'-4"	"	"	"	20'-3"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2		-	"
25	18	"	18	"	"	21'-4"	"	22'-4"	"	"	"	21'-3"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	-	"

MATERIAL FOR ONE PIER

H Height of pier	Concrete Cu yds	Cement Sacks	Sand Cu yds.	Gravel Cu yds.	Reinf. Steel Weight #	Lumber 2"x6"-S4S	Lumber 1"x10" shiplap	Form Rings	2"x6"-S4S Lining
11	35.6	208	15.6	31.7	538	23 pcs 12' / 10 - 16'	45 pcs 16'	12	26 pcs 12'
12	36.8	214	16.2	32.7	574	23 - 12' / 11 - 16'	47 " 16'	12	26 " 16'
13	38.2	223	16.8	33.7	648	23 " 12' / 12 " 16'	49 " 16'	14	26 " 16'
14	39.6	232	17.4	34.9	660	23 " 12' / 13 " 16'	51 " 16'	14	27 " 18'
15	40.8	239	17.9	35.9	716	43 " 12'	53 " 16'	16	25 - 24'
16	42.3	248	18.6	37.3	767	43 " 12'	55 " 16'	16	50 " 12'
17	43.6	255	19.1	38.3	788	21 " 12' / 20 " 14'	57 " 16'	18	50 " 12'
18	45.0	263	19.7	39.7	846	23 " 12' / 22 " 14'	59 " 16'	18	52 " 14'
19	46.5	272	20.4	40.9	920	23 " 12' / 23 " 16'	61 " 16'	20	52 " 14'
20	47.6	279	20.9	41.9	942	23 " 12' / 24 " 16'	63 " 16'	20	54 " 16'
21	48.5	290	21.7	43.5	1000	23 " 12' / 40 " 10'	65 " 16'	22	56 " 16'
22	49.6	296	22.2	44.5	1058	23 " 12' / 40 " 10'	67 " 16'	22	56 " 18'
23	51.5	307	23.1	46.3	1080	23 " 12' / 44 " 10'	69 " 16'	24	56 " 18'
24	53.2	317	23.8	47.7	...0	68 " 12'	71 " 16'	24	58 " 20'
25	54.8	326	24.5	49.1	1200	70 " 12'	73 " 16'	26	58 " 20'

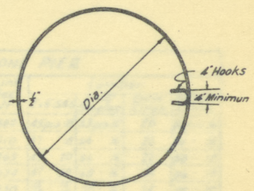


FORM RING DETAIL

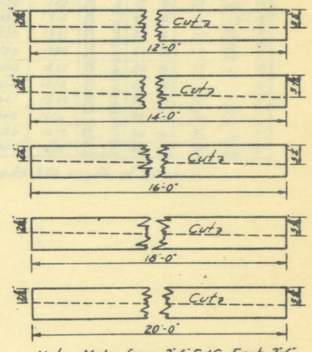
FORM RINGS FOR 1 PEIR

Location	No.	Radius of Finished Concrete	Radius of Form Ring
Cap	4	21"	22⅜"
Bottom of Cap	2	18"	19⅜"
2' Below Cap	2	19"	20⅜"
4" " "	2	20"	21⅜"
6" " "	2	21"	22⅜"
8" " "	2	22"	23⅜"
10" " "	2	23"	24⅜"
12" " "	2	24"	25⅜"
14" " "	2	25"	26⅜"
16" " "	2	26"	27⅜"
18" " "	2	27"	28⅜"
20" " "	2	28"	29⅜"

Tin lining for 12' height: 8 pcs. - 8"x2'-8". For each additional 3' in height add 2 pcs. 8"x2'-8"



REINFORCING HOOPS C13



Note: Make from 2"x6" S4S. Each 2"x6" to be ripped at mill.

CUTTING DETAILS FOR SHAFT LINING

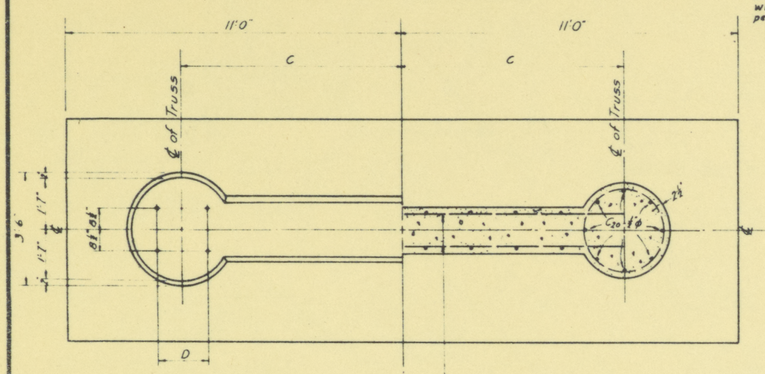
U S DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE APPROACH PIER
HEIGHTS 11' TO 25' INC.
12' ROADWAY

DESIGNED J.W.B.
TRACED L.H.C.
CHECKED A.L.K.
APPROVED 2-13-34 [illegible] Regional Engineer

MARCH 1934

SHEET 1 OF 1

DR. NO. 38



HALF PLAN

HALF SECTION

Scale ½"-1'0"

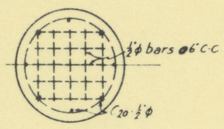
GENERAL NOTES

All concrete to be Class B

Class B concrete to be approx 1:2.4 mix with not less than 5½ sacks of cement per cu yd of concrete.

Maximum aggregate - 1½ inches.

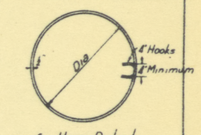
All rod dimensions shown are to centers of rods



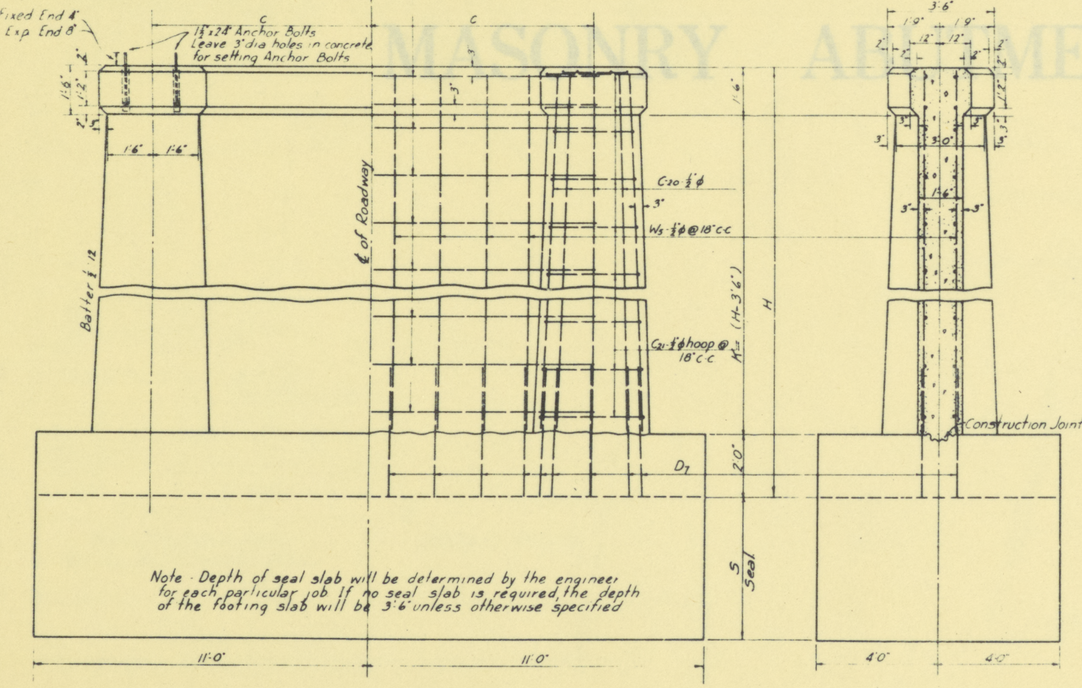
CAP GRILLAGE

ROD DETAILS FOR ONE PIER

H Height of Pier	¾ϕ Straight Bars D1 No	D1 length	Ws No	Ws length	W6 No	W6 length	C20 No	C20 length	G2 No	G2 length	C21 ¾ϕ hoops (See sketch below) W6-1-a No	W6-2-a No	W6-3-a No	W7-1-a No	W8-1-a No	W8-2-a No	W8-3-a No	W9-1-a No	W9-2-a No	W10-1-a No	W10-2-a No	W10-3-a No	W11-1-a No	W11-2-a No	W11-3-a No	W12-1-a No	W12-2-a No	W12-3-a No	W13-1-a No	W13-2-a No	W13-3-a No	W14-1-a No	W14-2-a No	W14-3-a No
19	32	4'0"	16	16'9"	24	14'6"	6	6'1"	20	2'3"	2	2	2	6	2	2	2	2	2	2														
20	"	"	"	17'9"	"	"	"	17'9"	"	"	2	2	2	6	2	2	2	2	2	2														
21	"	"	"	18'9"	"	"	"	18'4"	"	"	2	2	2	6	2	2	2	2	2	2	2													
22	"	"	"	19'9"	"	"	"	19'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2												
23	"	"	"	20'9"	"	"	"	20'4"	"	"	2	2	2	6	2	2	2	2	2	2	2	2												
24	"	"	"	21'9"	"	"	"	21'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2											
25	"	"	"	22'9"	"	"	"	22'4"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2										
26	"	"	"	23'9"	"	"	"	23'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2										
27	"	"	"	24'9"	"	"	"	24'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2									
28	"	"	"	25'9"	"	"	"	25'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2									
29	"	"	"	26'9"	"	"	"	26'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2								
30	"	"	"	27'9"	"	"	"	27'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2	2							
31	"	"	"	28'9"	"	"	"	28'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
32	"	"	"	29'9"	"	"	"	29'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
33	"	"	"	30'9"	"	"	"	30'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
34	"	"	"	31'9"	"	"	"	31'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
35	"	"	"	32'9"	"	"	"	32'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
36	"	"	"	33'9"	"	"	"	33'9"	"	"	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2



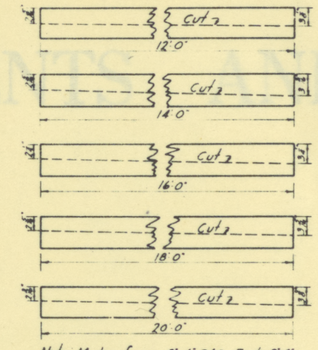
C21-Hoop Detail



Note - Depth of seal slab will be determined by the engineer for each particular job. If no seal slab is required, the depth of the footing slab will be 3'6" unless otherwise specified

ELEVATION
Scale ½"-1'0"

SECTION
Scale ½"-1'0"



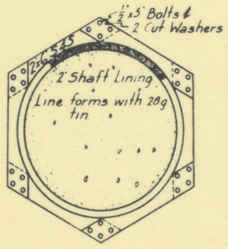
Note Make from 2"x6" S4S. Each 2"x6" to be ripped at the mill.

CUTTING DETAILS OF SHAFT LINING

MATERIAL FOR ONE PIER

H Height of Pier	Class B Concrete Cu Yds	Cement Sacks	Sand Cu Yds	Gravel Cu Yds	Reinf Steel Wt	Lumber 2"x6" S4S	Lumber 1"x12" Shiplap	Lumber Form Rings	Lumber 2"x6" Shoring Lining
19	462	270	203	406	880	45pcs 18'	63pcs 16'	20	60pcs 16'
20	476	279	209	418	910	47 - 18'	64 - 16'	22	54 - 16'
21	494	289	217	434	969	45 - 20'	66 - 16'	22	60 - 18'
22	515	301	226	452	1029	47 - 20'	68 - 16'	24	60 - 18'
23	530	310	233	466	1050	18 - 18' 45 - 18'	70 - 16'	24	60 - 20'
24	545	319	239	478	1110	24 - 18' 45 - 18'	72 - 16'	26	58 - 20'
25	566	331	248	496	1166	23 - 18' 45 - 18'	74 - 16'	26	112 - 12'
26	587	343	258	516	1189	24 - 18' 45 - 18'	76 - 16'	28	112 - 12'
27	606	355	266	532	1249	24 - 18' 47 - 18'	78 - 16'	28	112 - 12'
28	628	368	276	552	1314	28 - 18' 45 - 18'	80 - 16'	30	112 - 12'
29	649	380	285	570	1331	50 - 18' 45 - 18'	82 - 16'	30	28 - 8' 62 - 16'
30	672	393	295	590	1393	53 - 18' 43 - 18'	84 - 16'	32	84 - 14'
31	692	405	304	608	1455	34 - 16' 43 - 18'	86 - 16'	32	112 - 14'
32	715	418	314	628	1474	36 - 16' 43 - 18'	88 - 16'	34	112 - 16'
33	738	432	324	648	1539	38 - 16' 43 - 18'	90 - 16'	34	56 - 8' 56 - 16'
34	759	444	334	668	1601	40 - 16' 45 - 18'	92 - 16'	36	56 - 10' 56 - 16'
35	782	458	343	686	1623	40 - 16' 45 - 18'	94 - 16'	36	116 - 16'
36	805	471	354	708	1686	40 - 16' 48 - 18'	96 - 16'	38	116 - 16'

* Note:- For each foot of seal, add 326 cu yds of concrete



FORM RING DETAIL

FORM RINGS FOR ONE PIER

Location	No	Radius of Finished Concrete	Radius of Form Rings
Cap	4	21"	22½"
Bottom of Cap	2	18"	19½"
2" Below Cap	2	19"	20½"
4 " "	2	20"	21½"
6 " "	2	21"	22½"
8 " "	2	22"	23½"
10 " "	2	23"	24½"
12 " "	2	24"	25½"
14 " "	2	25"	26½"
16 " "	2	26"	27½"
18 " "	2	27"	28½"
20 " "	2	28"	29½"
22 " "	2	29"	30½"
24 " "	2	30"	31½"
26 " "	2	31"	32½"
28 " "	2	32"	33½"
30 " "	2	33"	34½"
32 " "	2	34"	35½"

Tin Lining for 12' height 8 pcs- 8"x2'-8". For each additional 3' in height add 2 pcs. 8"x2'-8"

DESIGNED J. J. B.
CHECKED A. L. K.
TRACED E. T. C.
APPROVED Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION NO. 1
CONCRETE INTERMEDIATE PIERS
HEIGHTS 19' TO 36' INCL.
12 FT. ROADWAY

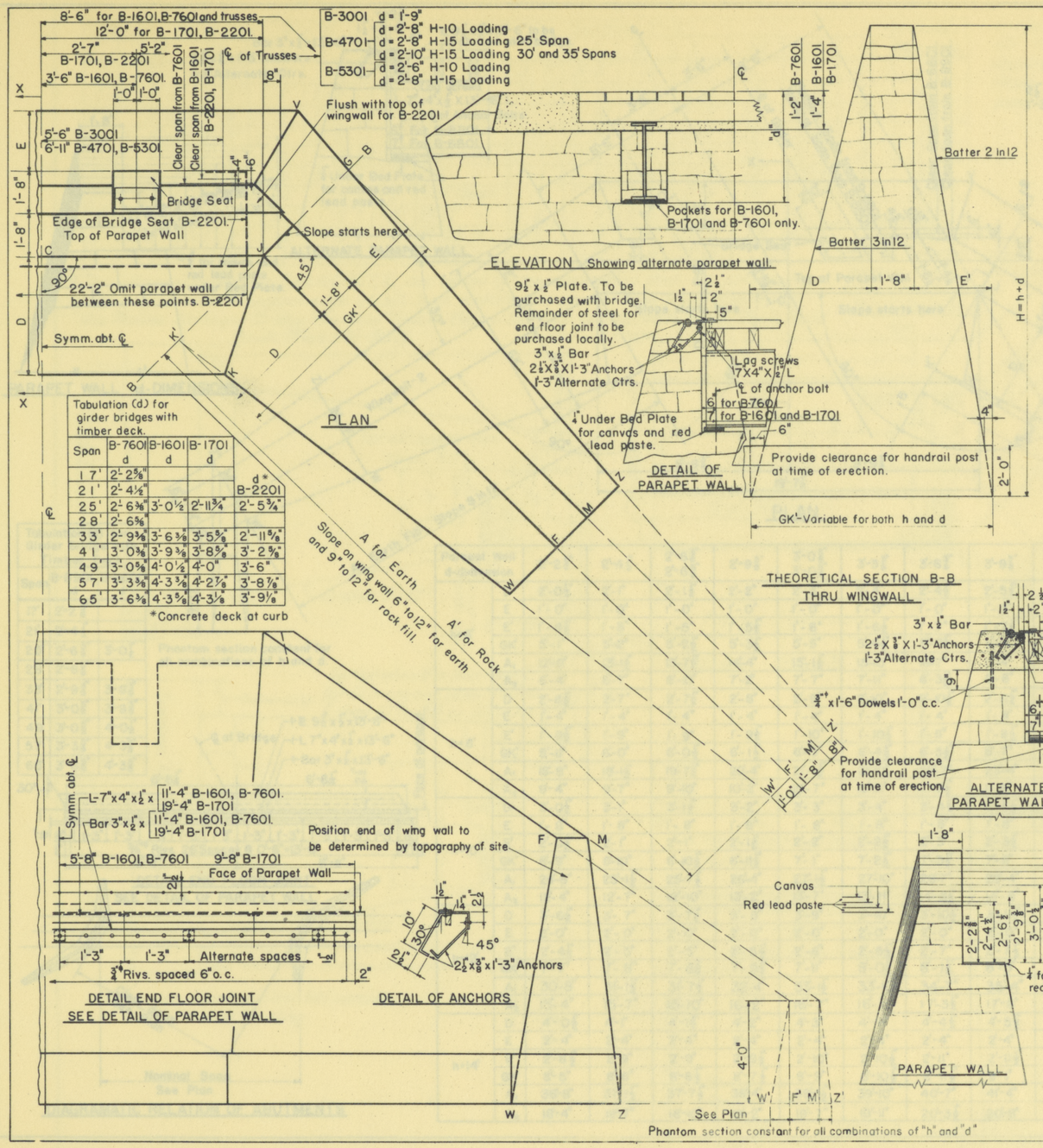
JUNE 1934 SHEET 1 OF 1

DR. NO. 44

MASONRY ABUTMENTS AND

SECTION 8

MASONRY ABUTMENTS AND PIERS



Parapet Wall d-dimension		1'-9" 2'-2⅝"	2'-4½"	2'-6" 2'-6⅜" 2'-6⅝"	2'-8" 2'-9⅛" 2'-10"	2'-11⅝" 3'-0⅜" 3'-½" 3'-⅝"	3'-3⅜"	3'-5⅝" 3'-6⅜"	3'-8⅝" 3'-9⅛"	4'-0" 4'-0½"	4'-2⅝" 4'-3⅛" 4'-3⅜" 4'-3⅝"
h = 6'	D	2'-0½"	2'-1"	2'-1½"	2'-2"	2'-3"	2'-4"	2'-5½"	2'-6"	2'-7"	
	E	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	
	E'	1'-4½"	1'-5"	1'-5"	1'-5½"	1'-6"	1'-6½"	1'-7"	1'-7½"	1'-8"	1'-8½"
	GK'	5'-1"	5'-2"	5'-2⅝"	5'-3½"	5'-5"	5'-6½"	5'-7½"	5'-9"	5'-10"	5'-11½"
	A	8'-5½"	8'-9"	9'-1"	9'-7"	10'-1"	10'-7"	11'-1"	11'-7"	12'-1"	12'-7"
	A'	5'-7½"	5'-10"	6'-1"	6'-4½"	6'-9"	7'-0½"	7'-4½"	7'-8½"	8'-1"	8'-5"
h = 8'	D	2'-6½"	2'-7"	2'-7½"	2'-8"	2'-9"	2'-10"	2'-10½"	2'-11½"	3'-0"	3'-1"
	E	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"
	E'	1'-8½"	1'-9"	1'-9"	1'-9½"	1'-10"	1'-10½"	1'-11"	1'-11½"	2'-0"	2'-0½"
	GK'	5'-11"	6'-0"	6'-0½"	6'-1½"	6'-3"	6'-4½"	6'-5½"	6'-7"	6'-8"	6'-9½"
	A	12'-5½"	12'-9"	13'-1"	13'-7"	14'-1"	14'-7"	15'-1"	15'-7"	16'-1"	16'-7"
	A'	8'-3½"	8'-6"	8'-9"	9'-0½"	9'-5"	9'-8½"	10'-0½"	10'-4½"	10'-9"	11'-1"
h = 10'	D	3'-0½"	3'-1"	3'-1½"	3'-2"	3'-3"	3'-4"	3'-4½"	3'-5½"	3'-6"	3'-7"
	E	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"
	E'	2'-0½"	2'-1"	2'-1"	2'-1½"	2'-2"	2'-2½"	2'-3"	2'-3½"	2'-4"	2'-4½"
	GK'	6'-9"	6'-10"	6'-10½"	6'-11½"	7'-1"	7'-2½"	7'-3½"	7'-5"	7'-6"	7'-7½"
	A	16'-5½"	16'-9"	17'-1"	17'-7"	18'-1"	18'-7"	19'-1"	19'-7"	20'-1"	20'-7"
	A'	10'-11½"	11'-2"	11'-5"	11'-8½"	12'-1"	12'-4½"	12'-8½"	13'-0½"	13'-5"	13' 9"
h = 12'	D	3'-6½"	3'-7"	3'-7½"	3'-8"	3'-9"	3'-10"	3'-10½"	3'-11½"	4'-0"	4'-1"
	E	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"
	E'	2'-4½"	2'-5"	2'-5"	2'-5½"	2'-6"	2'-6½"	2'-7"	2'-7½"	2'-8"	2'-8½"
	GK'	7'-7"	7'-8"	7'-8½"	7'-9½"	7'-11"	8'-0½"	8'-1½"	8'-3"	8'-4"	8'-5½"
	A	20'-5½"	20'-9"	21'-1"	21'-7"	22'-1"	22'-7"	23'-1"	23'-7"	24'-1"	24'-7"
	A'	13'-7½"	13'-10"	14'-1"	14'-4½"	14'-9"	15'-0½"	15'-4½"	15'-8½"	16'-1"	16'-5"
h = 14'	D	4'-0½"	4'-1"	4'-1½"	4'-2"	4'-3"	4'-4"	4'-4½"	4'-5½"	4'-6"	4'-7"
	E	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"
	E'	2'-8½"	2'-9"	2'-9"	2'-9½"	2'-10"	2'-10½"	2'-11"	2'-11½"	3'-0"	3'-0½"
	GK'	8'-5"	8'-6"	8'-6½"	8'-7½"	8'-9"	8'-10½"	8'-11½"	9'-1"	9'-2"	9'-3½"
	A	24'-5½"	24'-9"	25'-1"	25'-7"	26'-1"	26'-7"	27'-1"	27'-7"	28'-1"	28'-7"
	A'	16'-3½"	16'-6"	16'-9"	17'-0½"	17'-5"	17'-8½"	18'-0½"	18'-4½"	18'-9"	19'-1"

Layout procedure

1- On ℄ of bridge establish point C at back of parapet wall.
2- Knowing height of bridge seat and d of parapet wall select D and E from the table and lay out base of main stem on ℄.
3- From C locate point J.
4- From J lay off JF' at angle of 45° and GK' at right angles to JF'
5- Measure GK' equal to base width for wing wall of height H = h+d
6- Establish point F' from dimensions A or A' (Earth or Rock)
7- Lay off base of phantom section and establish points W' and Z'
8- Prolong Z'G to intersect toe of main stem at V
9- Intersect W'K' with heel of main stem at K.
10 Determine length of wing wall from topography of site and locate points W, F, M and Z. Dimensions of Section W-Z can be determined by field work or by direct proportions.

Design Data

Abutment - Horizontal surcharge of 300 lbs. per sq. ft.
Wing wall - Sloping surcharge 1½ to 1

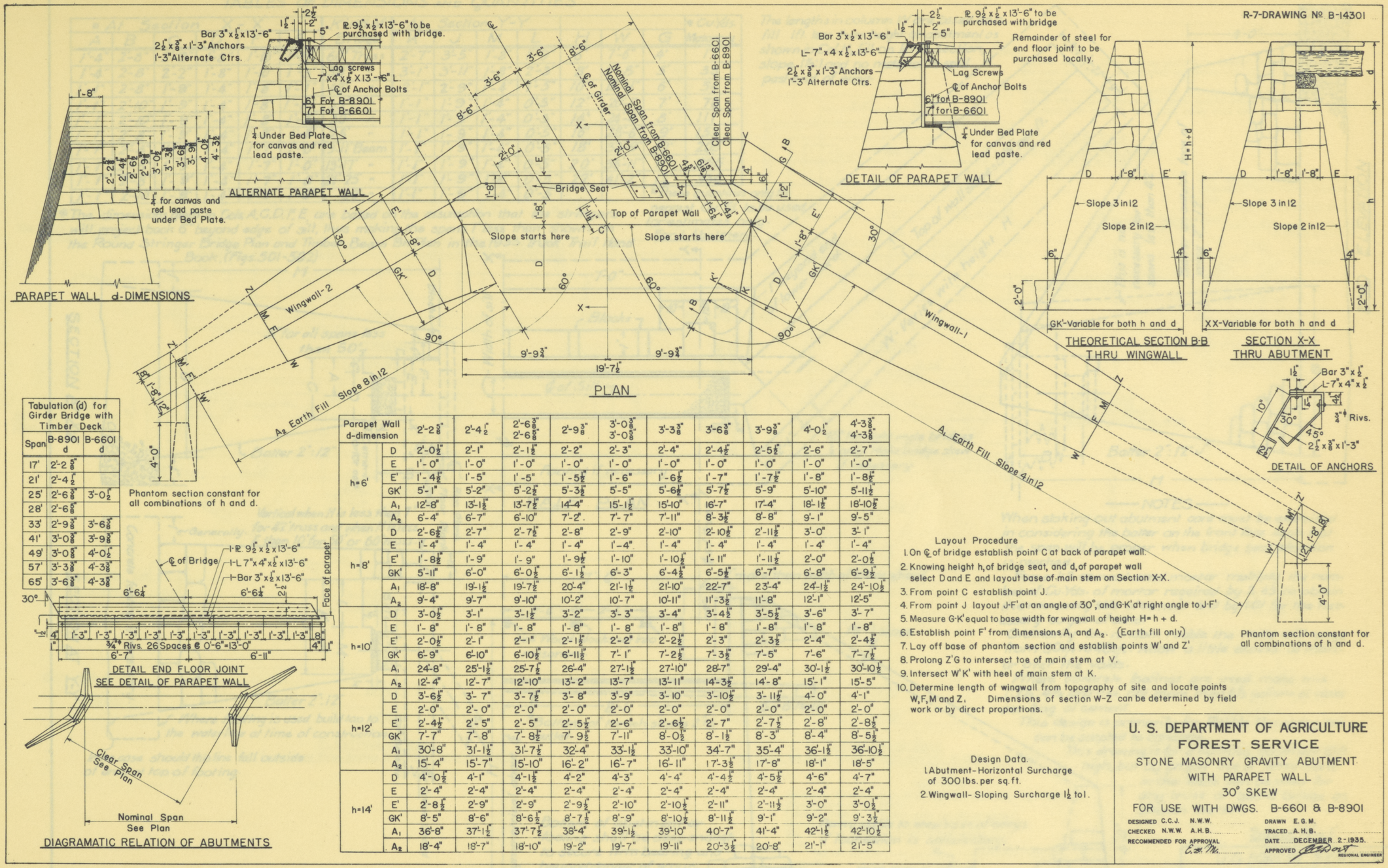
For this abutment skewed 30° See Dwg. B-14301

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

STONE MASONRY GRAVITY ABUTMENT
WITH PARAPET WALL
FOR USE WITH DWGS. INDICATED ON PLAN

DESIGNED C.C.J. N.W.W. — DRAWN N.W.W.
CHECKED E.G.M. C.C.J. — TRACED N.W.W.
RECOMMENDED FOR APPROVAL E.G.M. — DATE DECEMBER-9-1935
APPROVED ... REGIONAL ENGINEER

R-7-DRAWING № B-14301



Tabulation (d) for Girder Bridge with Timber Deck

Span	B-8901 d	B-6601 d
17'	2'-2 5/8"	
21'	2'-4 1/2"	
25'	2'-6 3/8"	3'-0 1/2"
28'	2'-6 5/8"	
33'	2'-9 3/8"	3'-6 3/8"
41'	3'-0 5/8"	3'-9 3/8"
49'	3'-0 5/8"	4'-0 1/2"
57'	3'-3 3/8"	4'-3 3/8"
65'	3'-6 3/8"	4'-3 3/8"

Phantom section constant for all combinations of h and d.

Parapet Wall d-dimension		2'-2 5/8"	2'-4 1/2"	2'-6 3/8" 2'-6 5/8"	2'-9 3/8"	3'-0 3/8" 3'-0 5/8"	3'-3 3/8"	3'-6 3/8"	3'-9 3/8"	4'-0 1/2"	4'-3 3/8" 4'-3 5/8"
h=6'	D	2'-0 1/2"	2'-1"	2'-1 1/2"	2'-2"	2'-3"	2'-4"	2'-4 1/2"	2'-5 1/2"	2'-6"	2'-7"
	E	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	E'	1'-4 1/2"	1'-5"	1'-5"	1'-5 1/2"	1'-6"	1'-6 1/2"	1'-7"	1'-7 1/2"	1'-8"	1'-8 1/2"
	GK'	5'-1"	5'-2"	5'-2 1/2"	5'-3 1/2"	5'-5"	5'-6 1/2"	5'-7 1/2"	5'-9"	5'-10"	5'-11 1/2"
	A1	12'-8"	13'-1 1/2"	13'-7 1/2"	14'-4"	15'-1 1/2"	15'-10"	16'-7"	17'-4"	18'-1 1/2"	18'-10 1/2"
	A2	6'-4"	6'-7"	6'-10"	7'-2".	7'- 7"	7'-11"	8'-3 1/2"	8'-8"	9'-1"	9'-5"
h=8'	D	2'-6 1/2"	2'-7"	2'-7 1/2"	2'-8"	2'-9"	2'-10"	2'-10 1/2"	2'-11 1/2"	3'-0"	3'-1"
	E	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"
	E'	1'-8 1/2"	1'-9"	1'-9"	1'-9 1/2"	1'-10"	1'-10 1/2"	1'-11"	1'-11 1/2"	2'-0"	2'-0 1/2"
	GK'	5'-11"	6'-0"	6'-0 1/2"	6'-1 1/2"	6'-3"	6'-4 1/2"	6'-5 1/2"	6'-7"	6'-8"	6'-9 1/2"
	A1	18'-8"	19'-1 1/2"	19'-7 1/2"	20'-4"	21'-1 1/2"	21'-10"	22'-7"	23'-4"	24'-1 1/2"	24'-10 1/2"
	A2	9'-4"	9'-7"	9'-10"	10'-2"	10'-7"	10'-11"	11'-3 1/2"	11'-8"	12'-1"	12'-5"
h=10'	D	3'-0 1/2"	3'-1"	3'-1 1/2"	3'-2"	3'- 3"	3'-4"	3'-4 1/2"	3'-5 1/2"	3'-6"	3'- 7"
	E	1'- 8"	1'- 8"	1'- 8"	1'- 8"	1'- 8"	1'- 8"	1'- 8"	1'- 8"	1'- 8"	1'- 8"
	E'	2'-0 1/2"	2'-1"	2'-1"	2'-1 1/2"	2'-2"	2'-2 1/2"	2'-3"	2'-3 1/2"	2'-4"	2'-4 1/2"
	GK'	6'- 9"	6'-10"	6'-10 1/2"	6'-11 1/2"	7'- 1"	7'-2 1/2"	7'-3 1/2"	7'-5"	7'-6"	7'-7 1/2"
	A1	24'-8"	25'-1 1/2"	25'-7 1/2"	26'-4"	27'-1 1/2"	27'-10"	28'-7"	29'-4"	30'-1 1/2"	30'-10 1/2"
	A2	12'-4"	12'-7"	12'-10"	13'-2"	13'-7"	13'-11"	14'-3 1/2"	14'-8"	15'-1"	15'-5"
h=12'	D	3'-6 1/2"	3'- 7"	3'-7 1/2"	3'- 8"	3'-9"	3'-10"	3'-10 1/2"	3'-11 1/2"	4'-0"	4'-1"
	E	2'-0"	2'- 0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"
	E'	2'-4 1/2"	2'- 5"	2'-5"	2'- 5 1/2"	2'-6"	2'-6 1/2"	2'-7"	2'-7 1/2"	2'-8"	2'-8 1/2"
	GK'	7'-7"	7'- 8"	7'- 8 1/2"	7'- 9 1/2"	7'-11"	8'-0 1/2"	8'-1 1/2"	8'-3"	8'-4"	8'- 5 1/2"
	A1	30'-8"	31'-1 1/2"	31'-7 1/2"	32'-4"	33'-1 1/2"	33'-10"	34'-7"	35'-4"	36'-1 1/2"	36'-10 1/2"
	A2	15'- 4"	15'-7"	15'-10"	16'- 2"	16'-7"	16'- 11"	17'-3 1/2"	17'-8"	18'-1"	18'-5"
h=14'	D	4'-0 1/2"	4'-1"	4'-1 1/2"	4'-2"	4'-3"	4'-4"	4'-4 1/2"	4'-5 1/2"	4'-6"	4'-7"
	E	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"	2'-4"
	E'	2'-8 1/2"	2'-9"	2'-9"	2'-9 1/2"	2'-10"	2'-10 1/2"	2'-11"	2'-11 1/2"	3'-0"	3'-0 1/2"
	GK'	8'-5"	8'-6"	8'-6 1/2"	8'-7 1/2"	8'-9"	8'-10 1/2"	8'-11 1/2"	9'-1"	9'-2"	9'-3 1/2"
	A1	36'-8"	37'-1 1/2"	37'-7 1/2"	38'-4"	39'-1 1/2"	39'-10"	40'-7"	41'-4"	42'-1 1/2"	42'-10 1/2"
	A2	18'-4"	18'-7"	18'-10"	19'-2"	19'-7"	19'-11"	20'-3 1/2"	20'-8"	21'-1"	21'-5"

Layout Procedure

1. On ℄ of bridge establish point C at back of parapet wall.
2. Knowing height h, of bridge seat, and d, of parapet wall select D and E and layout base of main stem on Section X-X.
3. From point C establish point J.
4. From point J layout J-F' at an angle of 30°, and G-K' at right angle to J-F'
5. Measure G-K' equal to base width for wingwall of height H = h + d.
6. Establish point F' from dimensions A_1 and A_2. (Earth fill only)
7. Lay off base of phantom section and establish points W' and Z'
8. Prolong Z'G to intersect toe of main stem at V.
9. Intersect W'K' with heel of main stem at K.
10. Determine length of wingwall from topography of site and locate points W, F, M and Z. Dimensions of section W-Z can be determined by field work or by direct proportions.

Design Data.

1. Abutment- Horizontal Surcharge of 300 lbs. per sq. ft.
2. Wingwall- Sloping Surcharge ½ to 1.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STONE MASONRY GRAVITY ABUTMENT
WITH PARAPET WALL
30° SKEW
FOR USE WITH DWGS. B-6601 & B-8901

DESIGNED C.C.J. N.W.W. DRAWN E.G.M.
CHECKED N.W.W. A.H.B. TRACED A.H.B.
RECOMMENDED FOR APPROVAL C.C.M. DATE DECEMBER 2-1935.
APPROVED REGIONAL ENGINEER

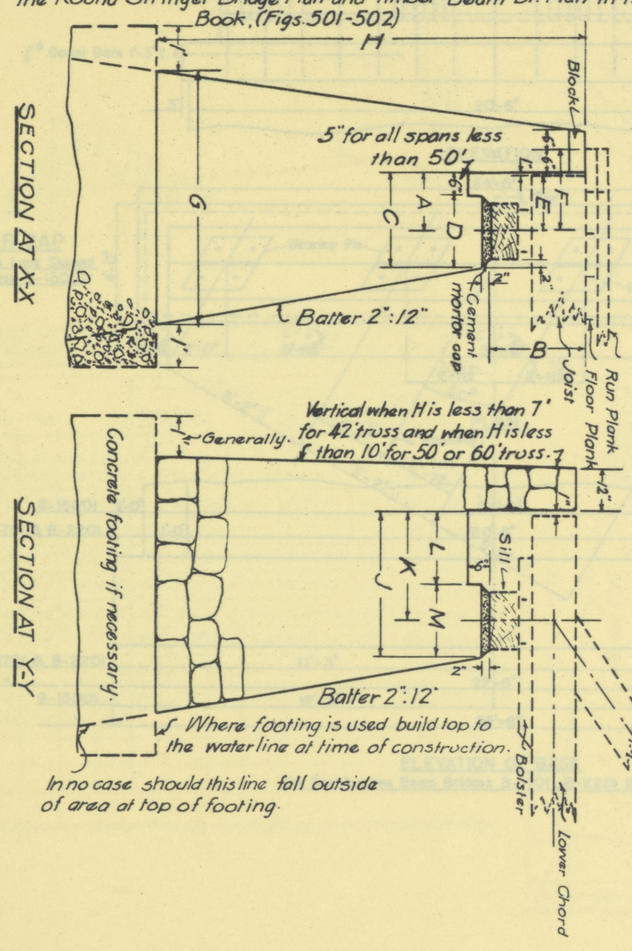
TABLES OF DIMENSIONS AND QUANTITIES

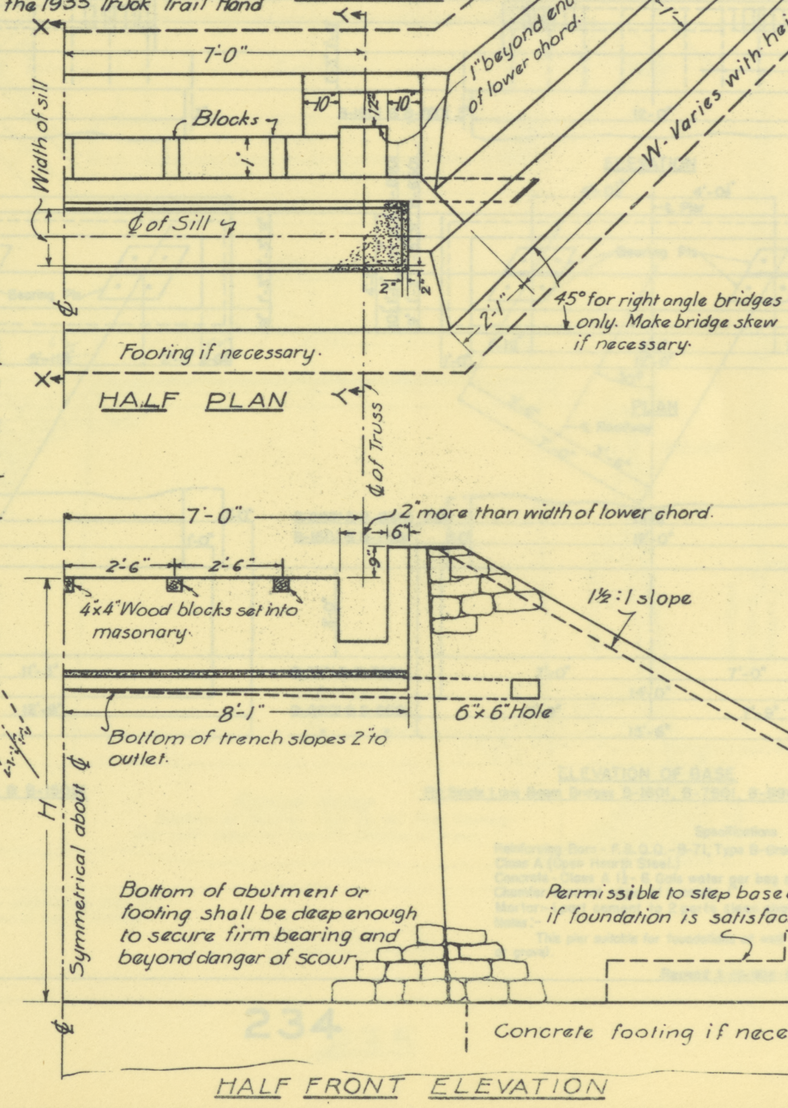
* At Section X-X						Kind of Bridge	At Section Y-Y							* Cu. Yds. Masonary
A	B	C	D	F	E		K	J	M	L	H	W	G	
1'-4"	2'-8"	2'-2"	1'-8"	1'-10"	1'-3"	60' Truss	2'-7"	3'-5"	1'-8"	1'-9"	6'	7'-6"	4'	17
1'-4"	2'-8"	2'-2"	1'-8"	1'-10"	1'-3"	50' "	3'-1"	3'-11"	1'-8"	2'-3"	8'	11'-8"	5'	33
1'-1"	2'-8"	1'-9"	1'-4"	1'-8"	1'-1"	42' "	2'-1"	2'-9"	1'-4"	1'-5"	10'	15'-11"	6'	54
1'-1"	2'-10"	1'-9"	1'-4"	1'-8"	1'-1"	35' "	1'-1"	1'-9"	1'-4"	0'-5"	12'	20'-1"	7'	78
1'-1"	2'-10"	1'-9"	1'-4"	1'-8"	1'-1"	30' "	1'-1"	1'-9"	1'-4"	0'-5"	14'	24'-4"	8'	111
1'-1"	2'-8"	1'-9"	1'-4"	1'-8"	1'-1"	25' "	1'-1"	1'-9"	1'-4"	0'-5"	16'	28'-6"	9'	153
1'-1"	2'-4"	1'-9"	1'-4"	1'-7"	1'-0"	9-11' Beam	1'-1"	1'-9"	1'-4"	0'-5"	18'	32'-9"	10'	205
1'-1"	2'-6"	1'-9"	1'-4"	1'-7"	1'-0"	13'-17' "	1'-1"	1'-9"	1'-4"	0'-5"	20'	36'-11"	11'	265
1'-1"	2'-8"	1'-9"	1'-4"	1'-7"	1'-0"	21'-25' "	1'-1"	1'-9"	1'-4"	0'-5"	22'	41'-2"	12'	336
1'-1"	2'-10"	1'-9"	1'-4"	1'-7"	1'-0"	29' "	1'-1"	1'-9"	1'-4"	0'-5"				

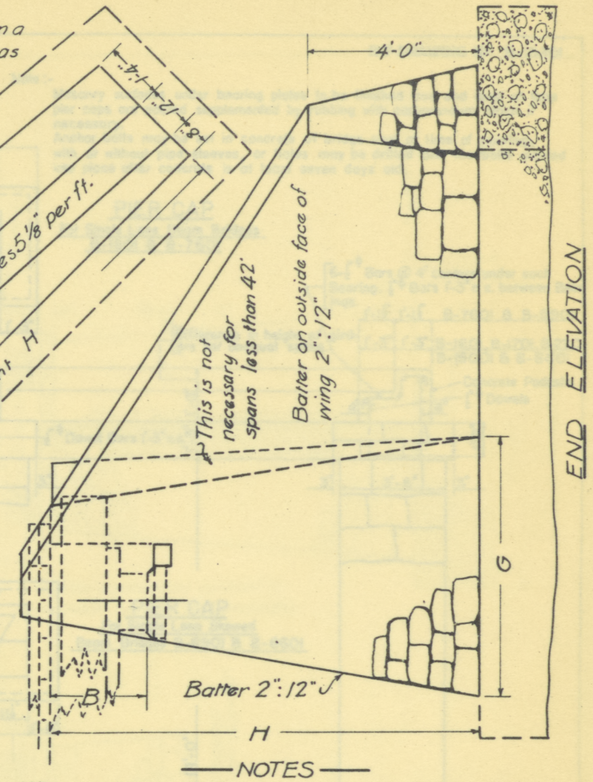
*These quantities only to nearest Cu. Yd. to be used for estimates only. For 1 Abutment.

*The dimensions given in Cols. A, C, D, F, E are based on the assumption that the stringers will project back 6" beyond edge of sill, thus making the spans 1' less than shown on the Round Stringer Bridge Plan and Timber Beam Br. Plan in the 1933 Truck Trail Hand Book. (Figs. 501-502)

The lengths in column W are based on a fill 1ft. less than height of abutment as shown in Col. H, fill on level section, slope 1½:1 and no material to spill past end of wing.







NOTES

When staking out abutment care must be exercised in considering the batter on the front face such that the span will be proper when bridge seat elevation is reached.

For a 1:3 cement-sand mortar multiply the number of Cu. Yds. of mortar required by 2.43 to obtain the necessary bbls. of cement and by 1.01 for the necessary cu. yds. of sand.

Ordinarily for random rubble the voids will range from 30% to 40%. Allow a little excess of mortar over the voids.

Where concrete footings are used make mix 1:2½:4½ and use not more than 6½ gallons of water per bag of cement.

This design is primarily for Rubble Masonary but can be adapted to concrete.

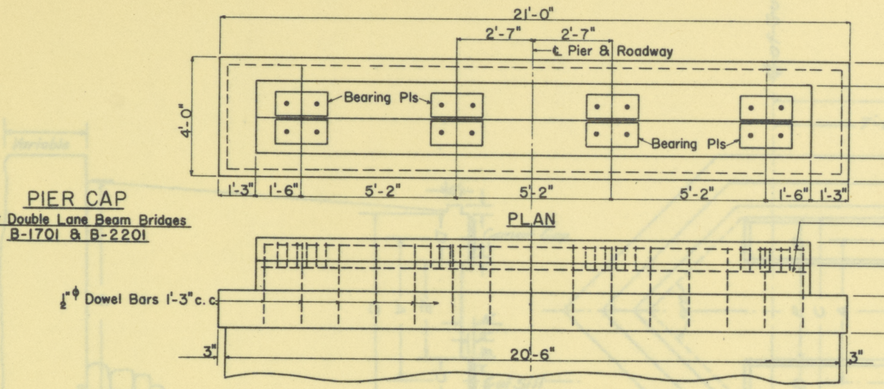
This drawing is for a 60' truss, abutment 10 ft. high, but by proper use of dimensions in the Table can be used for any truss or beam bridge as shown therein.

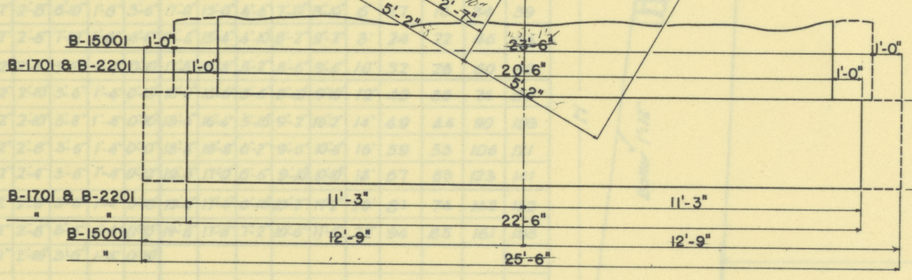
SCALE ½" = 1'

U.S. FOREST SERVICE
REGION No 4.
RUBBLE MASONRY ABUTMENT
OGDEN, UTAH, FEB. 1936.
J. P. Martin, Reg. Engineer.
Designed, J.P.M. & F.L.A.
Traced, F.L.A.
Checked, E.K.T.

Note :-
Masonry surfaces under bearing plates to be finished true and level at time pier caps are poured supplemented by rubbing with carborundum block if necessary.
Anchor bolts may be set in concrete of bridge seat at time of pouring, with or without pipe sleeves, or holes may be drilled and the bolts grouted into place after concrete is at least seven days old.

PIER CAP
For Double Lane Beam Bridges B-1701 & B-2201

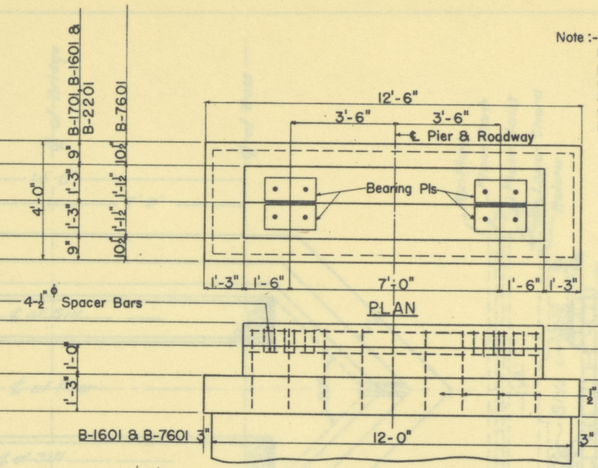


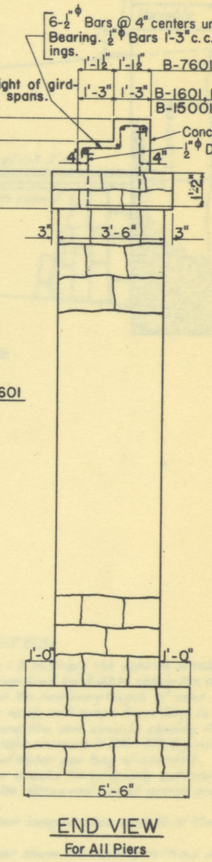


ELEVATION OF BASE
For Double Lane Beam Bridges B-1701, B-2201 & B-15001

PIER CAP
For Double Lane Skewed Beam Bridge B-15001

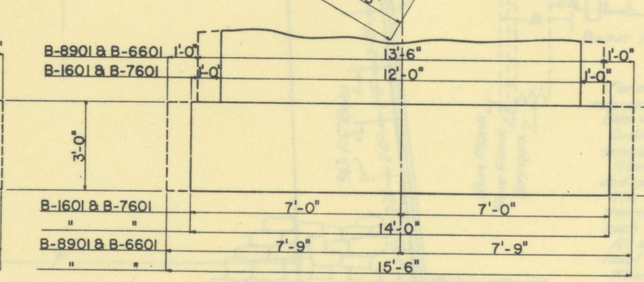
PIER CAP
For Single Lane Beam Bridges B-1601 & B-7601





Difference in height of girders for unequal spans.

PIER CAP
For Single Lane Skewed Beam Bridges B-8901 & B-6601



ELEVATION OF BASE
For Single Lane Beam Bridges B-1601, B-7601, B-8901 & B-6601

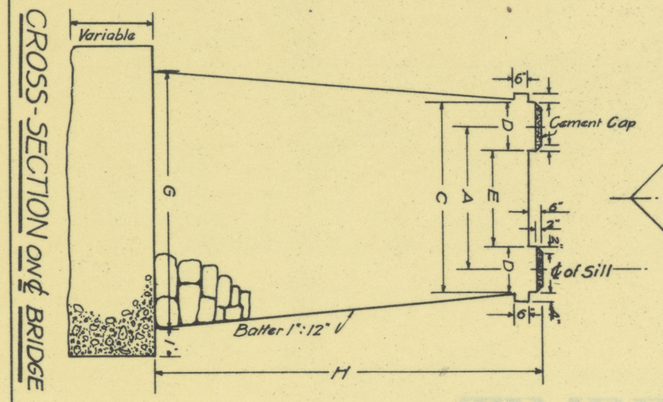
END VIEW
For All Piers

Specifications
Reinforcing Bars - F.S.Q.Q.-B-71, Type B-Grade I (Deformed Structural) Class A (Open Hearth Steel.)
Concrete - Class A 1½ - 6 Gals water per bag of cement.
Chamfer exposed edges of concrete 1".
Mortar:- 1 part cement to 2 parts clean sharp sand.
Notes :-
This pier suitable for foundations of well compacted clay or gravel.

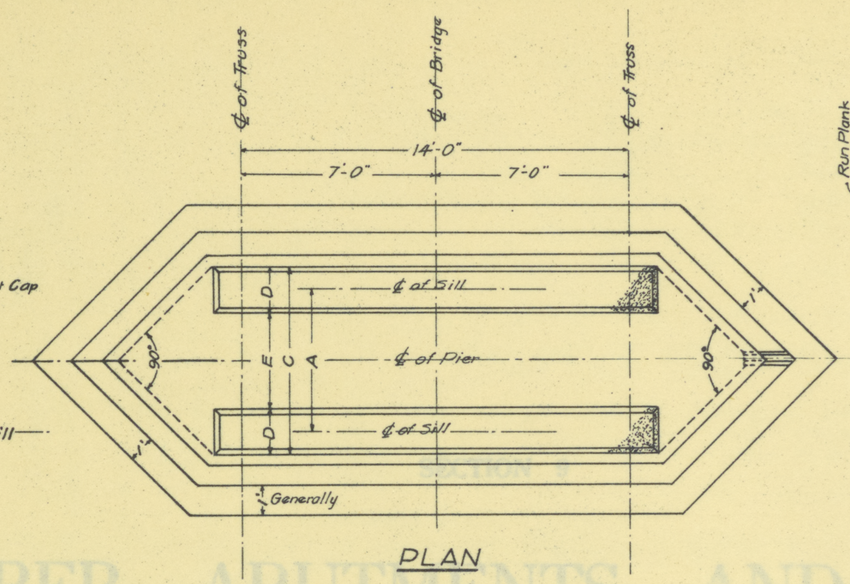
Revised 2-10-1936 - Notes added. - C. C. J.

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STONE MASONRY PIERS
FOR USE WITH BEAM BRIDGES
DWGS. B-1601, B-1701, B-2201, B-7601,
DWGS. B-6601, B-8901 & B-15001.

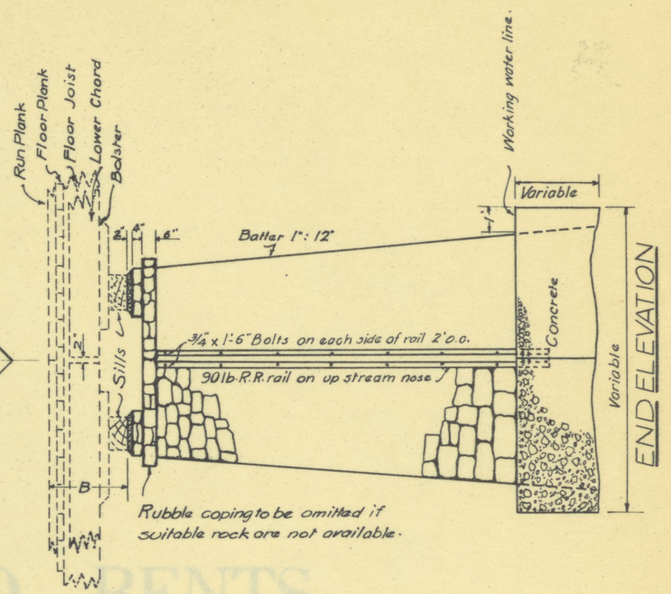
DESIGNED E. G. M. — DRAWN E. G. M., C. C. J.
CHECKED C. C. J. — TRACED E. G. M., C. C. J.
RECOMMENDED FOR APPROVAL C.S.M.C. — DATE DECEMBER 1935
APPROVED REGIONAL ENGINEER



GROSS-SECTION on ℄ BRIDGE



PLAN



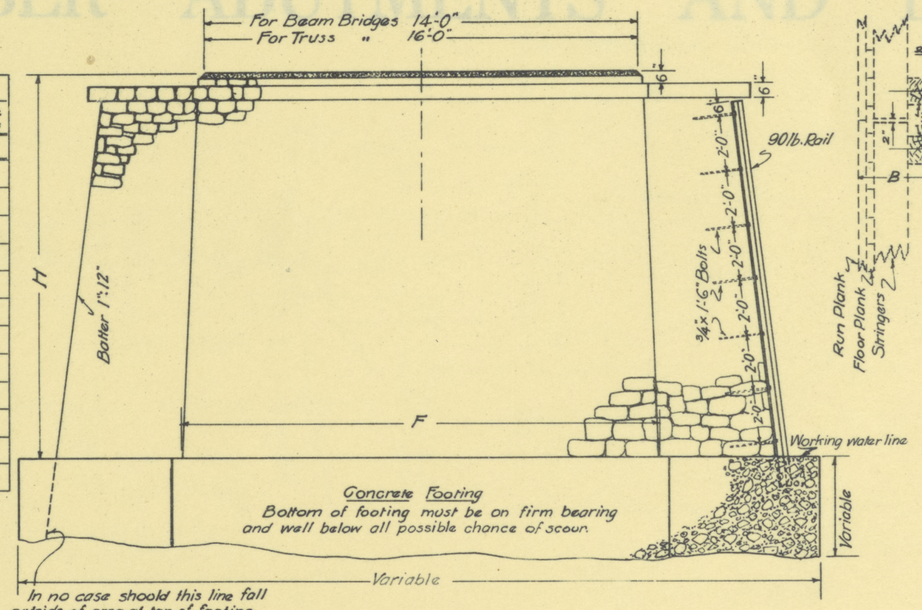
END ELEVATION

TABLES OF DIMENSIONS AND QUANTITIES

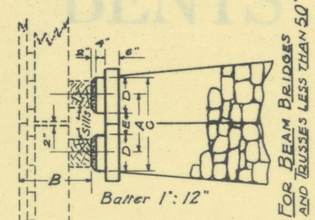
The quantities in this table have been computed to the nearest "cubic" yard and should be used for estimating only.

KIND OF BRIDGE	PIER TOP					BASE						Cu. Yds. of MASONRY ABOVE FOOTING			
						TRUSS SPANS	BEAM SPANS		FOR 60' TRUSS	FOR 50' TRUSS	HEIGHT OF PIER ABOVE FOOTING	TRUSS BRIDGE	BEAM BRIDGE	60 Ft. TRUSS	50 Ft. TRUSS
	A	B	C	D	E	F	F	G	G	G	H				
60' TRUSS	5'-2"	2'-8"	6'-10"	1'-8"	3'-6"	11'-0"	15'-0"	4'-6"	7'-10"	8'-10"	6'	17	16	34	39
50' TRUSS	6'-2"	2'-8"	7'-10"	1'-8"	4'-6"	17'-4"	15'-4"	4'-10"	8'-2"	9'-2"	8'	24	22	46	54
42' TRUSS	2'-2"	2'-8"	3'-6"	1'-4"	0'-10"	17'-8"	15'-8"	5'-2"	8'-6"	9'-6"	10'	32	28	60	69
35' TRUSS	2'-2"	2'-10"	3'-6"	1'-4"	0'-10"	18'-0"	16'-0"	5'-6"	8'-10"	9'-10"	12'	40	36	74	85
30' TRUSS	2'-2"	2'-10"	3'-6"	1'-4"	0'-10"	18'-4"	16'-4"	5'-10"	9'-2"	10'-2"	14'	49	44	90	103
25' TRUSS	2'-2"	2'-8"	3'-6"	1'-4"	0'-10"	18'-8"	16'-8"	6'-2"	9'-6"	10'-6"	16'	59	53	106	121
9'-11" BEAM	2'-2"	2'-4"	3'-6"	1'-4"	0'-10"	19'-0"	17'-0"	6'-6"	9'-10"	10'-10"	18'	67	63	123	141
15'-17" BEAM	2'-2"	2'-6"	3'-6"	1'-4"	0'-10"	19'-4"	17'-4"	6'-10"	10'-2"	11'-2"	20'	81	74	142	162
21'-25" BEAM	2'-2"	2'-8"	3'-6"	1'-4"	0'-10"	19'-8"	17'-8"	7'-2"	10'-6"	11'-6"	22'	94	85	161	183
29' BEAM	2'-2"	2'-10"	3'-6"	1'-4"	0'-10"										

NOTE:
Base dimensions and quantities are for height as given in column H only.



SIDE ELEVATION



NOTES

For a cement sand mortar, mixture 1:3, multiply the volume of voids in the masonry, or the cu. yds of mortar required by 2.43 to obtain the necessary Bbls. of cement and by 1.01 to obtain the necessary cu. yds. of sand.

Ordinarily for random rubble the voids will range from 30% to 40% depending on the shape of stones and the care used in placing them.

If concrete is used for mortar make mixture 1: 2½: 4½ by volume and use not more than 6½ gallons of water per bag of cement.

The ingredients of the concrete should be properly selected and thoroughly mixed, sand should be screened out of gravel and placed back in the correct proportion.

All stones most be bedded on their longest side and ⅓ of the superficial area should be headers.

Where impossible to obtain proper stone for coping without excessive cost, omit the coping.

Working water line should be interpreted as meaning the water level at time of construction in dry stream beds or washes use the natural ground level for top of footing.

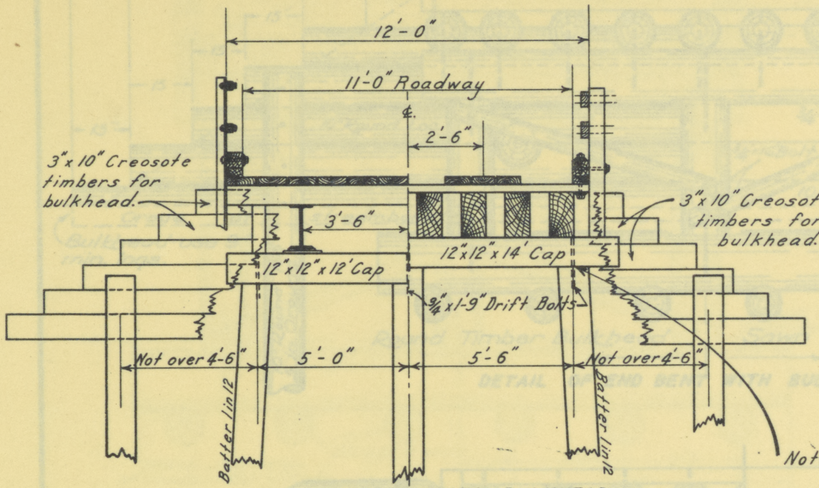
Scale 3/8" = 1'

U.S. FOREST SERVICE
REGION N24.
RUBBLE MASONRY PIER
FOR
TRUSS AND BEAM BRIDGES
Ogden, Utah - January, 1936.
J.P. Martin - Reg. Engineer.
Designed by J.P.M. and F.L.A.
Drawn by F.L.A.
Checked by E.K.T.
Approved

SECTION 9

TIMBER ABUTMENTS AND BENTS

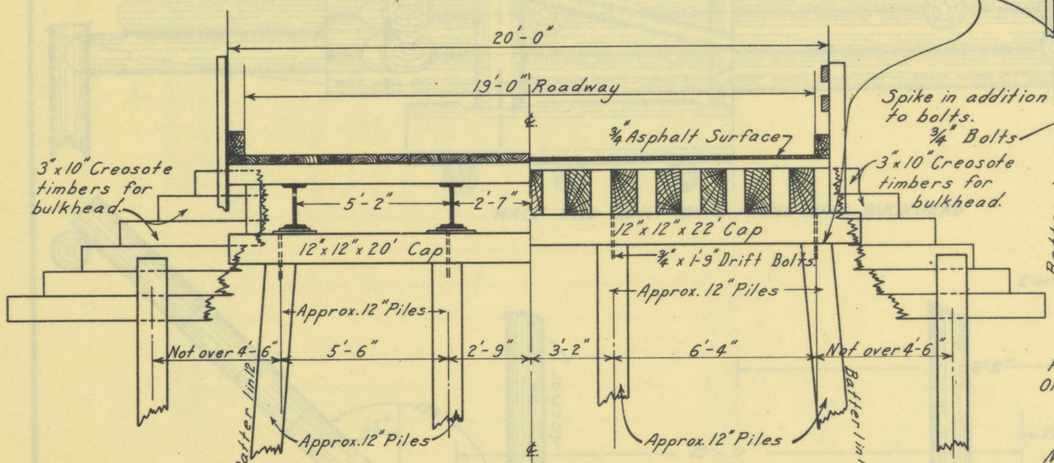
DWG. NO. B-2801



3 POST BENT WITH BULKHEAD
(For Single Track Bridges)

HALF SECTION SHOWING GIRDER

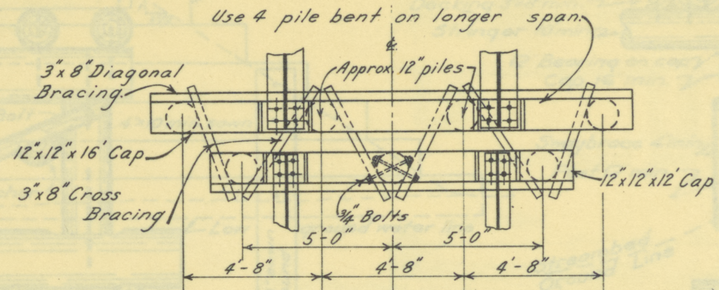
HALF SECTION SHOWING TIMBER STRINGERS



4 POST BENT WITH BULKHEAD
(For Double Track Bridges)

HALF SECTION SHOWING GIRDERS

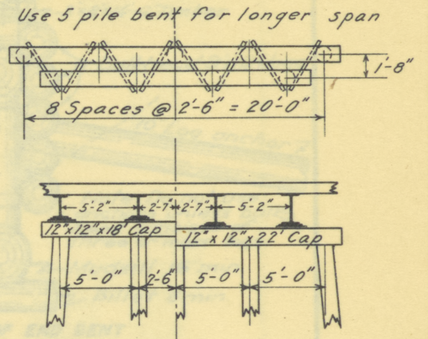
HALF SECTION SHOWING TIMBER STRINGERS



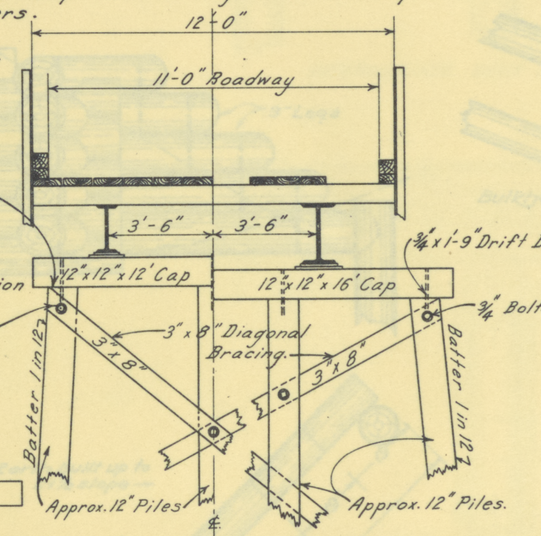
PLAN VIEW OF INTERMEDIATE PILE BENT FOR GIRDER SPANS — 11-FT. ROADWAY

Note:-
For multiple timber stringer spans use single 3 or 4 pile bent, same as end bent for single track or double track bridge, without bulkhead. Lap inside stringers on bent cap and butt outside stringers.

Note:-
Treat heads of piles with hot creosote and pitch, and cover with 28 gauge galvanized iron bent down to shed water.

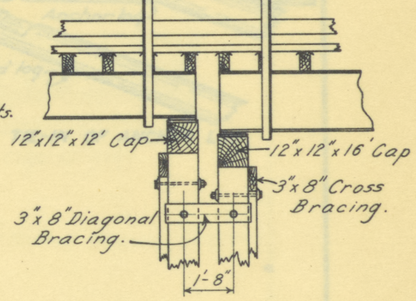


INTERMEDIATE BENT FOR 19-FT. ROADWAY
(Use same bracing as for 11-ft. roadway)



HALF SECTION OF 3 PILE BENT

HALF SECTION OF 4 PILE BENT



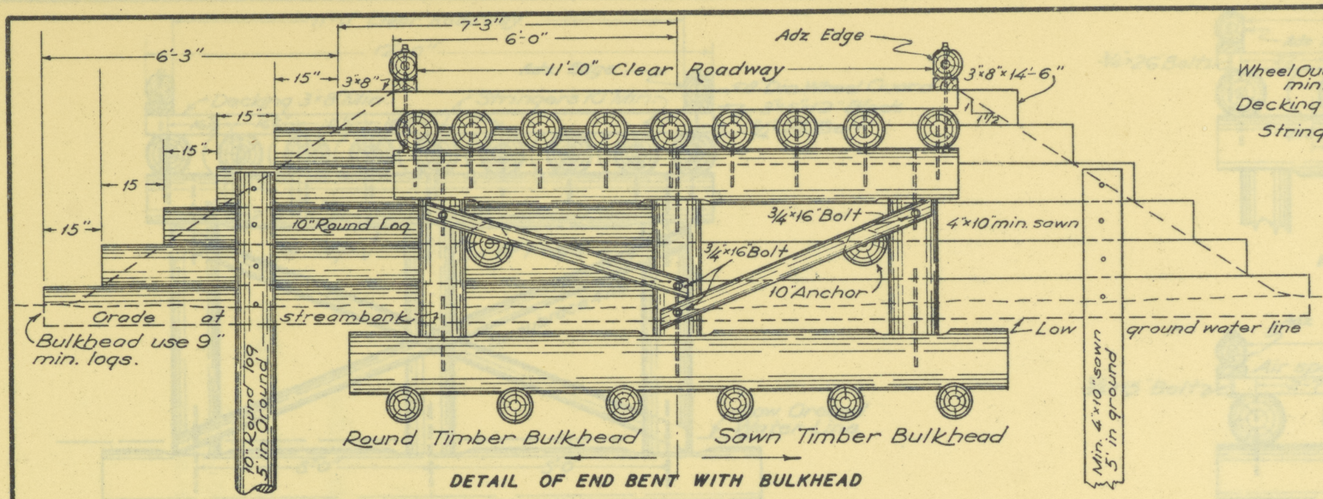
SIDE VIEW

DESIGN DATA

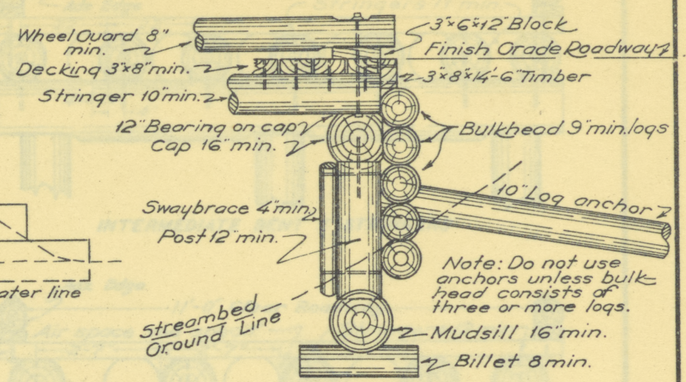
Minimum bearing per pile not less than 10 tons.
Use timber decking on all steel girder bridges with pile bents.
Limit height of bulkhead to 6-feet.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-7
TIMBER PILE BENTS & ABUTMENTS
11-FT. & 19-FT. ROADWAY

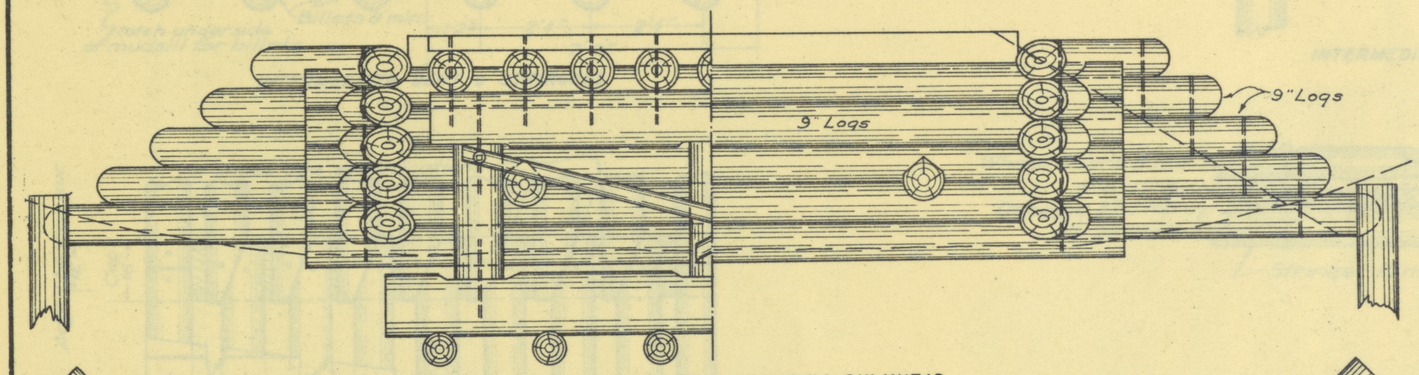
DESIGNED & CHECKED R.F.P. & D.B.
DRAWN M.E.G. TRACED M.E.G.
APPROVED [signature] Regional Eng. DATE Feb. 1933



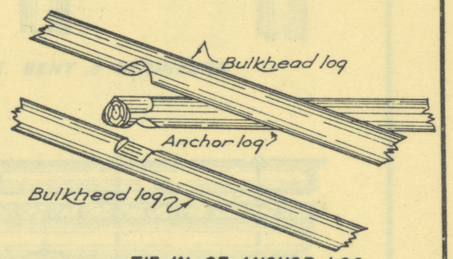
DETAIL OF END BENT WITH BULKHEAD



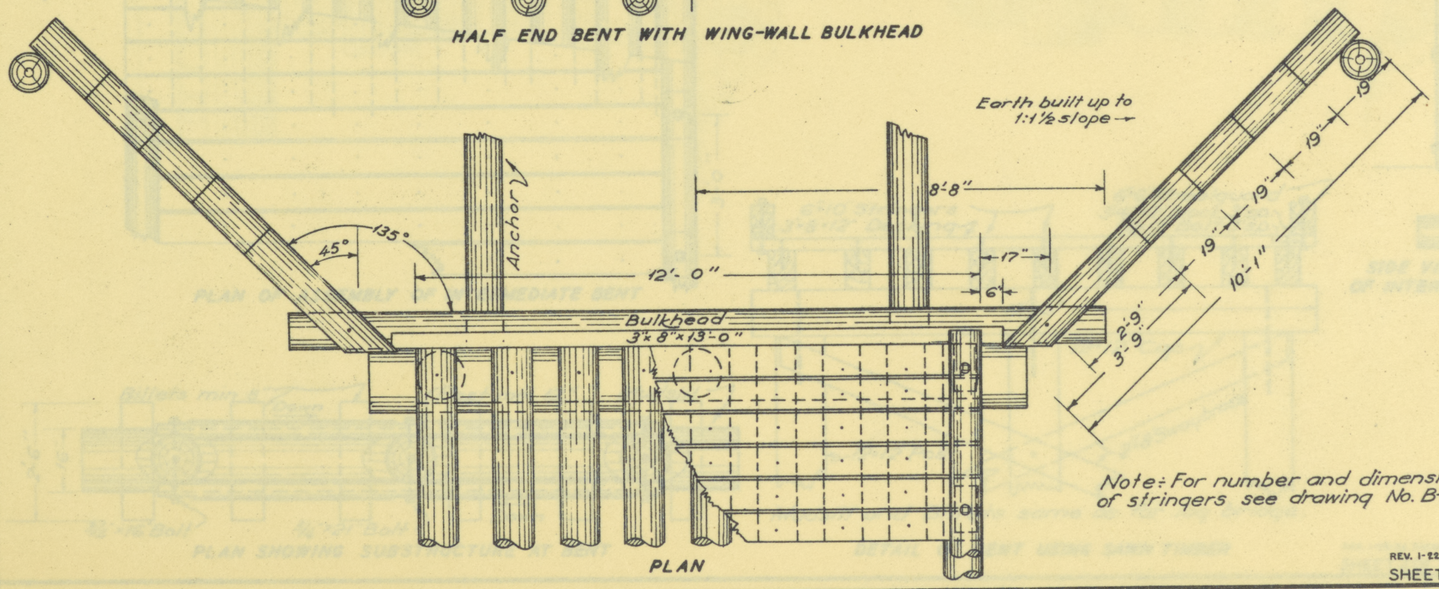
SECTION OF END BENT WITH BULKHEAD



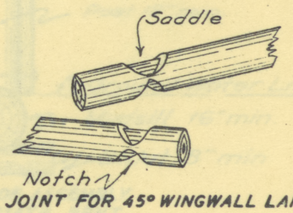
HALF END BENT WITH WING-WALL BULKHEAD



TIE-IN OF ANCHOR LOG



PLAN



JOINT FOR 45° WINGWALL LAP

Note: For number and dimensions of stringers see drawing No. B-3103.

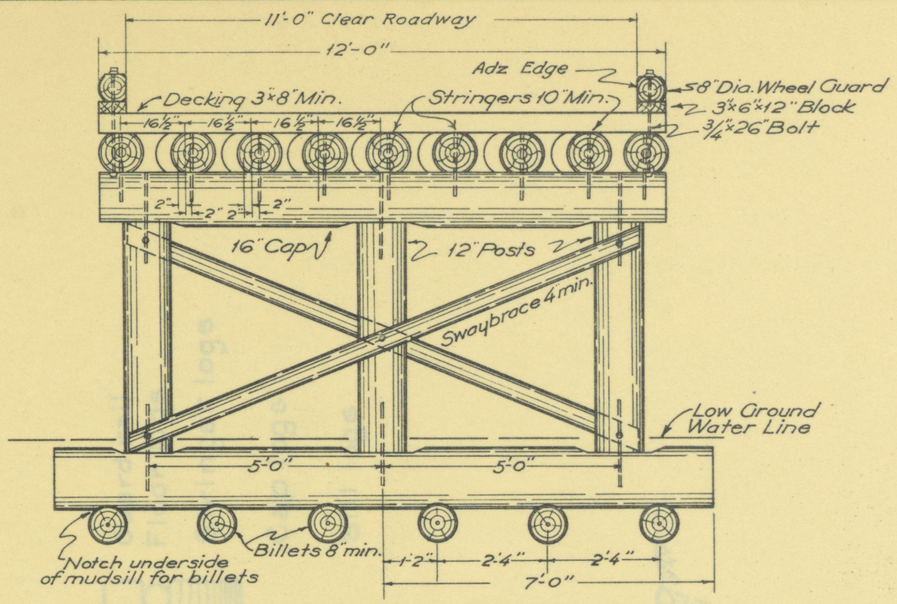
REV. 1-22-36 R.W.W.

SHEET 1 OF 3

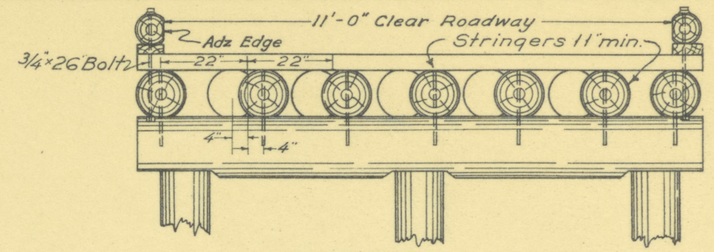
U.S. DEPT. OF AGRICULTURE
FOREST SERVICE
REGION EIGHT

LOG CRIB ABUTMENT
FOR SANDY AND LOOSE SOILS
USING SMALL TIMBER

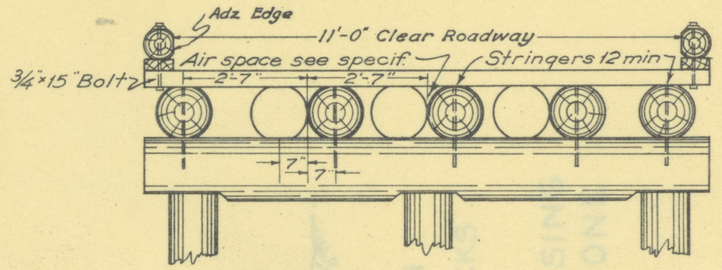
DRAWN BY W.W.M. DATE _____ DRAWING NO.
APPROVED BY _____ DATE 12-4-35 B-3101
TRACED BY G.W.A. DATE _____



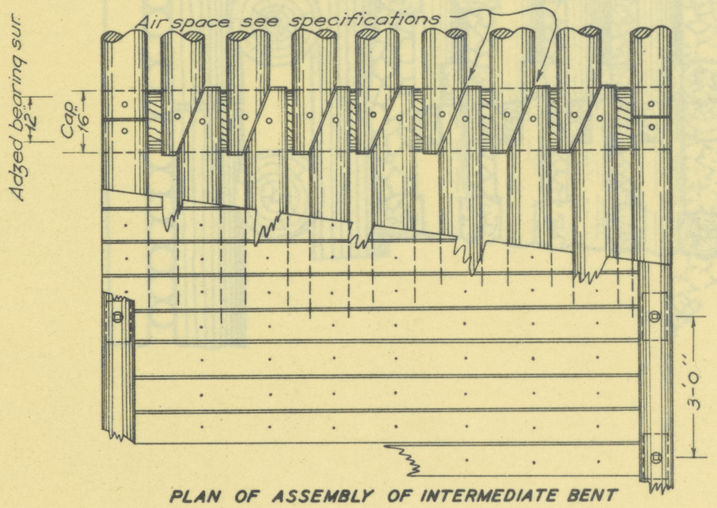
INTERMEDIATE BENT 9 STRINGERS



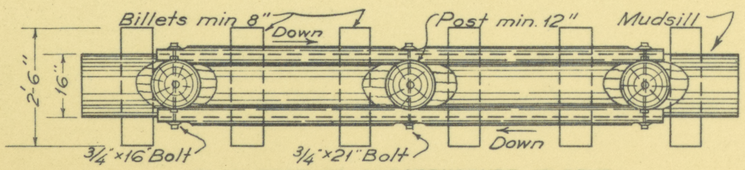
INTERMEDIATE BENT 7 STRINGERS



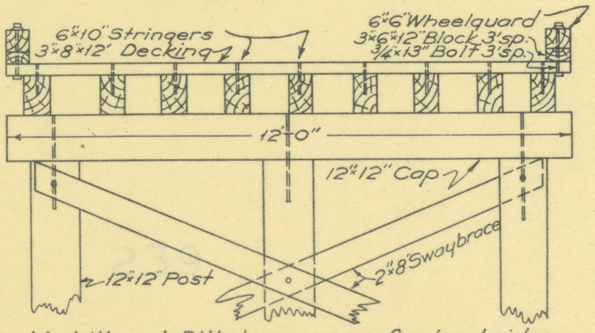
INTERMEDIATE BENT 5 STRINGERS



PLAN OF ASSEMBLY OF INTERMEDIATE BENT



PLAN SHOWING SUBSTRUCTURE AT BENT



Mudsill and Billets same as for log bridge.

DETAIL OF BENT USING SAWN TIMBER

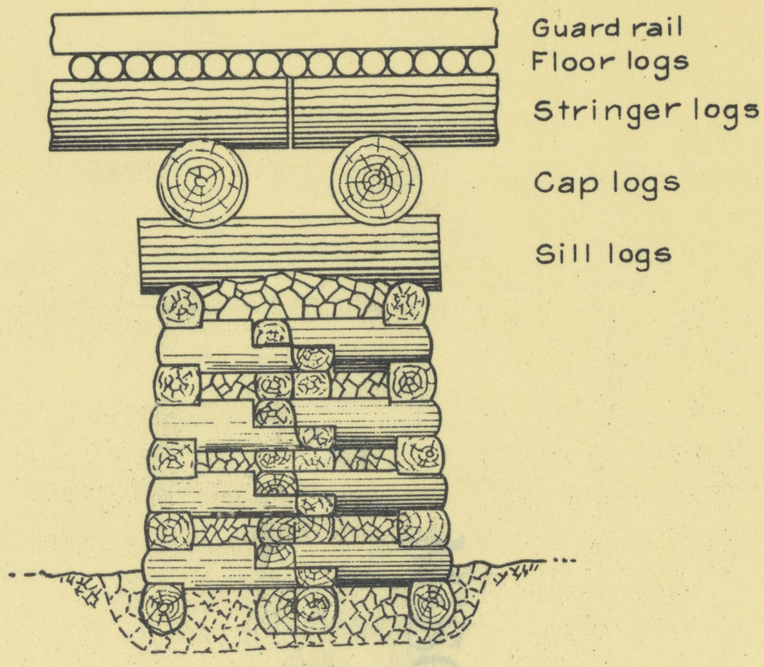
SIDE VIEW OF ASSEMBLY OF INTERMEDIATE BENT

U.S. DEPT. OF AGRICULTURE
FOREST SERVICE
REGION EIGHT

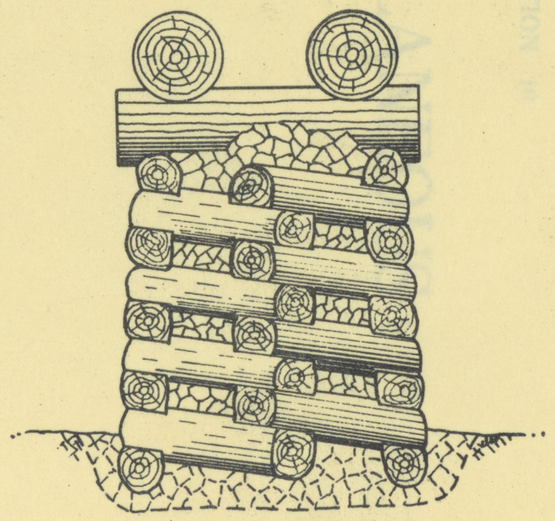
FRAMED TIMBER BENTS
ROUND OR SAWN TIMBER

DRAWN BY W.W.M. DATE ____ DRAWING NO.
APPROVED BY [illegible] DATE 12-4-35
TRACED BY G.W.A. DATE ____ B-3102

REV. 1-22-36 P.W.W.
SHEET 2 OF 3



END VIEW

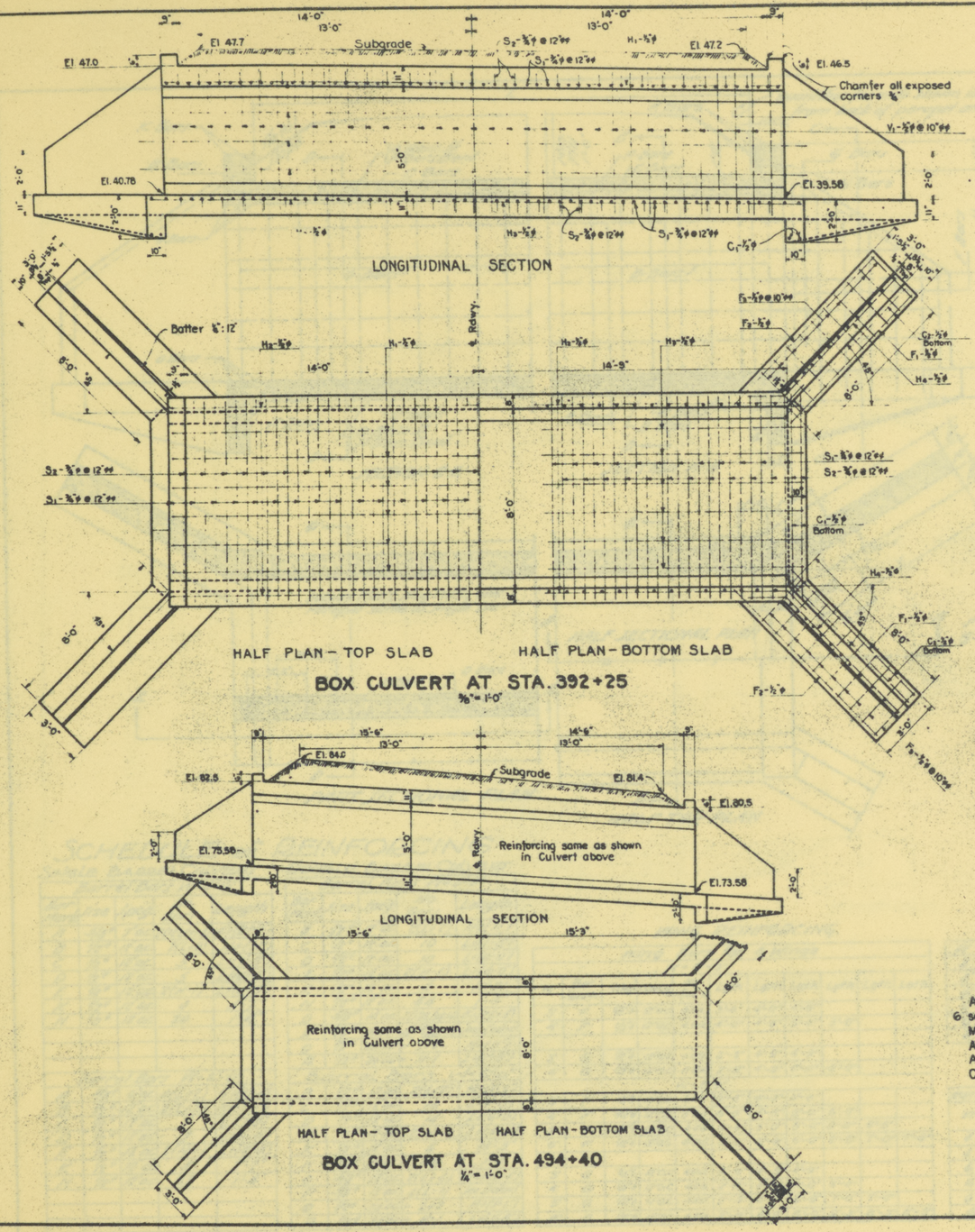


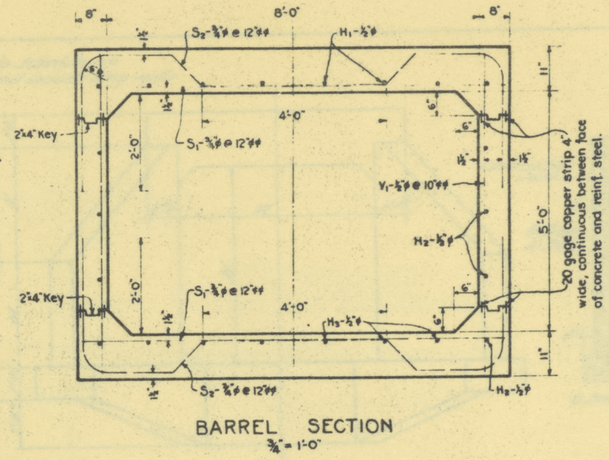
SUBSTITUTE DESIGN
OF END OF PIER
ELIMINATING USE OF BLOCKS

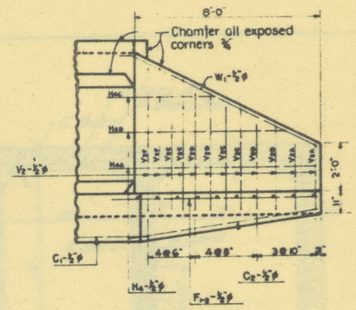
LOG CRIB PIER
ALTERNATIVE DESIGN USING
TWO CAPS INSTEAD OF ONE

SECTION 10

MISCELLANEOUS





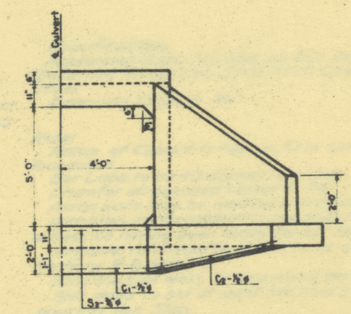


ROD DETAILS

Mark	Size	Sketch	For Culvert at Sta 392+25 Total Length	No.	For Culvert at Sta 494+40 Total Length	No.
S_1	⅝		9'-0"	62	9'-0"	64
S_2			15'-0⅝"	58	15'-0⅝"	60
C_1	⅝		9'-0"	4	9'-0"	4
C_2	"	"	8'-6"	8	8'-6"	8
F_1	"	"	8'-0"	4	8'-0"	4
F_2	"	"	10'-0"	4	10'-0"	4
F_3	"	"	2'-8"	40	2'-8"	40
H_1	"	"	15'-5"	12	16'-5"	12
H_2	"	Field Bend	17'-1"	20	18'-1"	20
H_3	"		16'-3"	12	17'-3"	12
H_{4A}	"	Field Bend	9'-6"	4	9'-6"	4
H_{4B}	"	"	8'-0"	4	8'-0"	4
H_{4C}	"	"	5'-0"	4	5'-0"	4
V_1	"		6'-6"	70	6'-6"	76
V_{2A}	"	"	2'-9"	8	2'-9"	8
V_{2B}	"	"	3'-6"	8	3'-6"	8
V_{2C}	"	"	4'-3"	8	4'-3"	8
V_{2D}	"	"	5'-0"	8	5'-0"	8
V_{2E}	"	"	5'-6"	8	5'-6"	8
V_{2F}	"	"	6'-0"	8	6'-0"	8
W_1	"	"	10'-0"	8	10'-0"	8

GENERAL NOTES

All concrete to be 1:2:4 mix with not less than 6 sacks of cement per cu. yd.
Maximun aggregate 1½ inches.
All rod dimensions shown are to rod centers.
All reinforcing to be deformed bars.
Chamfer all exposed corners ⅜".

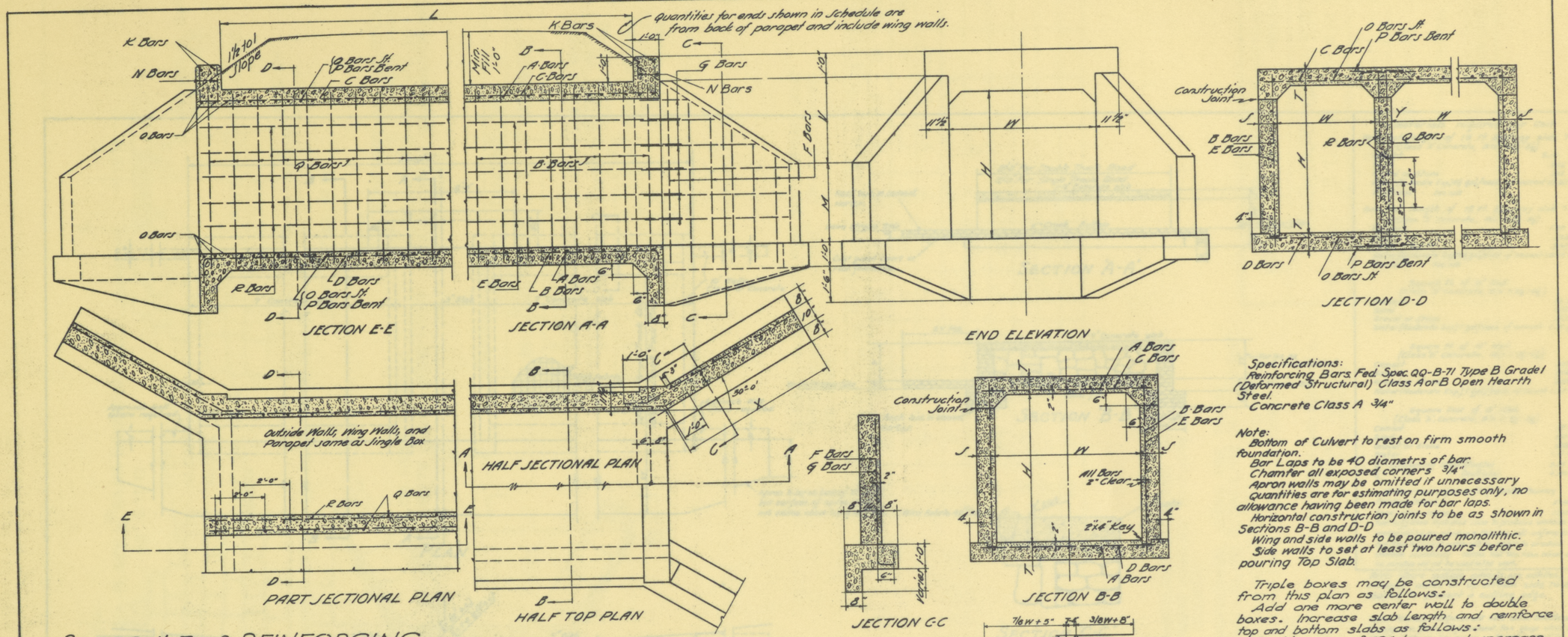


QUANTITIES

	Culvert at Sta 392+25	Culvert at Sta 494+40
Concrete	33.0 Cu Yds.	36.8 Cu Yds.
Reinf. Steel	3415 lbs.	3542 lbs.

Designed O. I. Kalb
Traced A. L. K.
Checked
Approved 12/9/35 H. H. Thomas Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No. 1
8'×5' CONCRETE BOX CULVERTS
LEWIS & CLARK HIGHWAY
STA. 392+25 & STA. 494+40
LOLO NATIONAL FOREST
Scale as shown DEC. 1935
DRG. No. 180



SCHEDULE of REINFORCING

SINGLE BARREL CULVERT

Bar Mark	Size	Spcg.	No. Bars	Length
Barrel Bars W=4'-0"				
A	5/8"	7" oc.	2(12L/7+4)	4+(2F+4)
B	1/2"	12" oc.	2(L+2)	H+(11")
C	1/2"	12" oc.	5	L+(1'-8")
D	1/2"	12" oc.	5	L+(6'-0")
E	1/2"	12" oc.	2(H-1)	L+(6'-0")
K	1/2"	12" oc.	4	5'-7"
N	1/2"	12" oc.	24	1'-8"
Barrel Bars W=6'-0"				
A	5/8"	6" oc.	4(L+2)	6+(2F+4)
B	1/2"	12" oc.	2(L+2)	H+(1'-1")
C	1/2"	12" oc.	7	L+(1'-8")
D	1/2"	12" oc.	7	L+(6'-0")
E	1/2"	12" oc.	2(H-1)	L+(4'-0")
K	1/2"	12" oc.	4	7'-7"
N	1/2"	12" oc.	32	1'-4"

DOUBLE BARREL CULVERT

Bar Mark	Size	Spcg.	No. Bars	Length
Barrel Bars W=4'-0"				
B	1/2"	12" oc.	2(L+2)	H+(11")
C	1/2"	12" oc.	10	L+(1'-8")
D	1/2"	12" oc.	10	L+(6'-0")
E	1/2"	12" oc.	2(H-1)	L+(4'-0")
K	1/2"	12" oc.	4	10'-3"
N	1/2"	12" oc.	44	1'-8"
O	5/8"	14" oc.	2(12L/14+4)	8+(2H+4)
P	5/8"	14" oc.	4(12L/14-1)	See Detail
Q	1/2"	24" oc.*	L+2	H+(11")
R	1/2"	24" oc.*	H-1	L+(1'-8")
Barrel Bars W=6'-0"				
B	1/2"	12" oc.	2(L+2)	H+(1'-1")
C	1/2"	12" oc.	18	L+(1'-8)
D	1/2"	12" oc.	18	L+(6'-0)
E	1/2"	12" oc.	2(H-1)	L+(4'-0")
K	1/2"	12" oc.	4	14'-3"
N	1/2"	12" oc.	60	1'-8"
O	5/8"	12" oc.	2(L+4)	12+(2H+6)
P	5/8"	12" oc.	4(L-1)	See Detail
Q	1/2"	24" oc.*	L+2	H+(1'-1")
R	1/2"	24" oc.*	H-1	L+(1'-8")

L & H in above equations are in feet. * 24" o.c. Staggered.
O & P Bars 14" oc. At St. & Bent

WING REINFORCING

Wing Bars for 4 Wings

H	Bar Mark	Size	Spcg.	No. Bars	Lgth.	Lgth.	Lgth.	Lgth.	Lgth.	Lgth.
W = 4'-0"										
3'	F	1/2"	12" oc.	4 ea.	3'-6"	4'-0"	4'-6"			
4'	F	1/2"	12" oc.	4 ea.	4'-0"	4'-6"	5'-0"	5'-6"		
3'	G	1/2"	12" oc.	4 ea.	2'-9"	4'-9"	4'-9"			
4'	G	1/2"	12" oc.	4 ea.	2'-9"	4'-9"	6'-0"	6'-0"		
W = 6'-0"										
3'	F	1/2"	12" oc.	4 ea.	3'-6"	4'-0"	4'-6"			
4'	F	1/2"	12" oc.	4 ea.	4'-0"	4'-6"	5'-0"	5'-6"		
5'	F	1/2"	12" oc.	4 ea.	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	
6'	F	1/2"	12" oc.	4 ea.	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"
3'	G	1/2"	12" oc.	4 ea.	2'-9"	4'-9"	4'-9"			
4'	G	1/2"	12" oc.	4 ea.	2'-9"	4'-9"	6'-0"	6'-0"		
5'	G	1/2"	12" oc.	4 ea.	2'-9"	4'-9"	6'-9"	7'-0"	7'-0"	
6'	G	1/2"	12" oc.	4 ea.	2'-9"	4'-9"	6'-9"	8'-3"	8'-3"	8'-3"

CULVERT DIMENSIONS

W	H	SINGLE Mat.	DOUBLE Mat.	T	J	M	V	Y	X
4'	3'	120#	240#	7½"	7"	2'-2"	1'-5½"	8"	3'-0"
4'	4'	160	320	7½"	8"	2'-6"	2'-1½"	8"	4'-2"
6'	3'	180	360	8½"	7"	2'-3"	1'-5½"	8"	3'-0"
6'	4'	240	480	8½"	8"	2'-7"	2'-1½"	8"	4'-2"
6'	5'	300	600	8½"	9"	2'-11"	2'-9½"	8"	5'-4"
6'	6'	360	720	8½"	9"	3'-3"	3'-5½"	8"	6'-6"

QUANTITIES

WIDTH W	HEIGHT H	QUANTITIES PER FOOT OF BARREL: SINGLE Steel	SINGLE Conc.	DOUBLE Steel	DOUBLE Conc.	QUANTITIES IN CULVERT ENDS: SINGLE Steel	SINGLE Conc.	DOUBLE Steel	DOUBLE Conc.
4'	3'	31.89#	0.393 Cy.	65.54#	0.693 Cy.	178.0 #	4.0 Cy.	279.71#	4.69 C.y.
4'	4'	35.15	0.468 "	69.30#	0.786 "	225.0 #	5.35 "	329.13#	6.06 "
6'	3'	45.98	0.532 "	97.00#	0.866 "	215.6 #	4.52 "	356.60#	5.68 "
6'	4'	49.33	0.608 "	100.96#	1.040 "	262.73#	5.87 "	406.15#	7.02 "
6'	5'	52.72	0.698 "	104.92#	1.180 "	317.43#	7.35 "	463.27#	8.52 "
6'	6'	55.40	0.785 "	108.87#	1.261 "	380.88#	9.21 "	529.16#	10.40 "

Revised for triple boxes 1-4-36

Specifications:
Reinforcing Bars Fed. Spec. QQ-B-71 Type B Grade I (Deformed Structural) Class A or B Open Hearth Steel.
Concrete Class A 3/4"

Note:
Bottom of Culvert to rest on firm smooth foundation.
Bar Laps to be 40 diametrs of bar.
Chamfer all exposed corners 3/4"
Apron walls may be omitted if unnecessary
Quantities are for estimating purposes only, no allowance having been made for bar laps.
Horizontal construction joints to be as shown in Sections B-B and D-D
Wing and side walls to be poured monolithic.
Side walls to set at least two hours before pouring Top Slab.

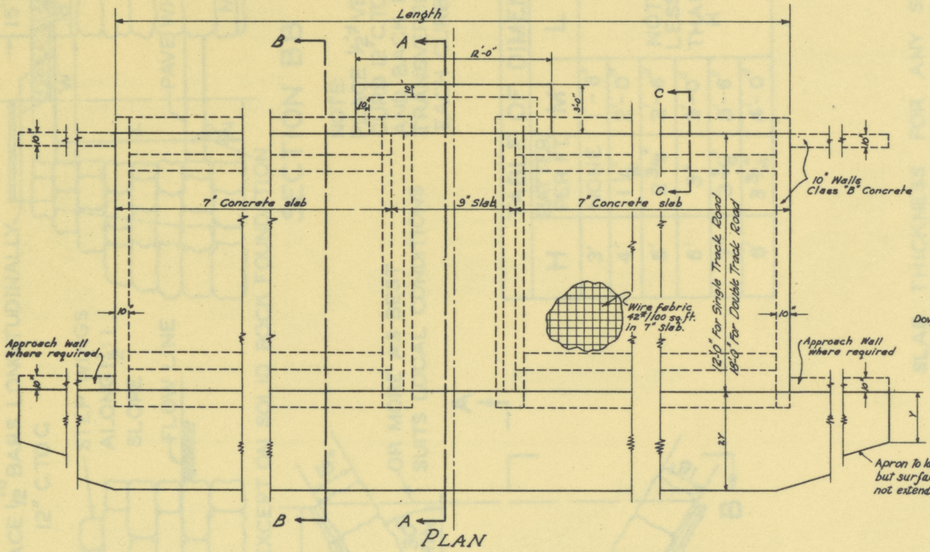
Triple boxes may be constructed from this plan as follows:
Add one more center wall to double boxes. Increase slab Length and reinforce top and bottom slabs as follows:
Double no. of "O" bars and increase length by W+8". Place these bars in bottom of top slab and top of bottom slab.
Omit "P" bars and substitute therefor.
Omit straight bars, same no. as "O" bars, - length = 2W+1'-4". Place these bars in the top of the top slab and the bottom of the bottom slab, the center of the bars to be over the center of the middle opening. Double quantity of "Q" and "R" bars. Add to quantities shown for double barrel a number of "C", "D" and "N" bars equal to difference between no. of bars for double barrel and single barrel culverts. Increase length of "K" bars by W+8". For estimating quantities add to double barrel quantities the difference between double and single barrel quantities.

Maximum Height of Fill 12 ft.
Minimum " " " 1ft.
Loading H-15

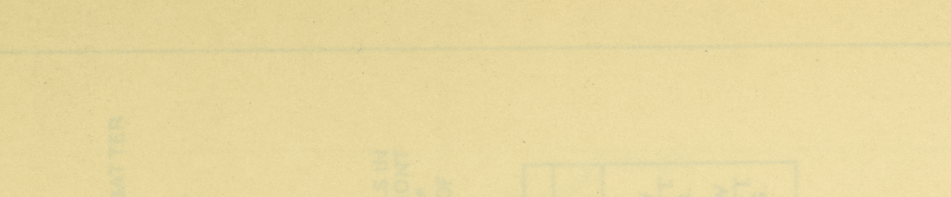
U.S. DEPT. OF AGRICULTURE
FOREST SERVICE
REGION 8

CONCRETE BOX CULVERT

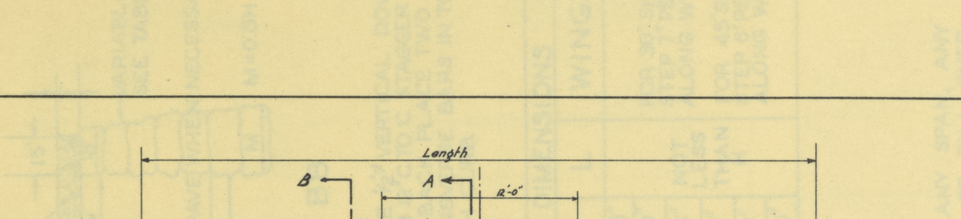
DRAWN BY M.K.H.	SHEET 1 OF 1	DRAWING NO.
CHECKED BY J.H.	DATE OCT. 1935	C-601
DESIGNED BY P.W.M.	APPROVED	



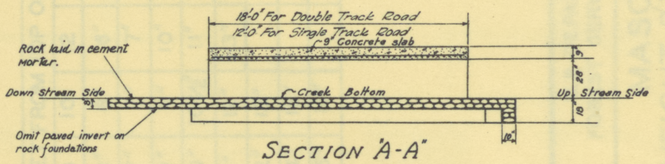
PLAN



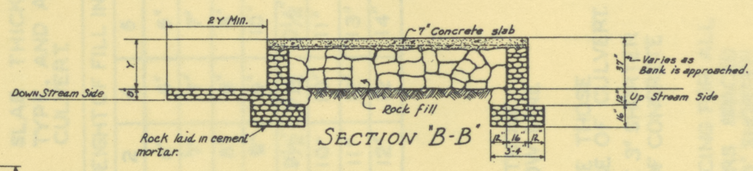
SECTION THRU ℄ OF ROADWAY SHOWING SINGLE CULVERT



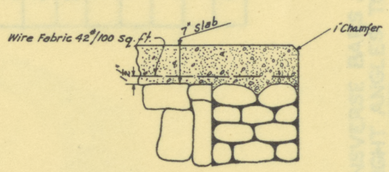
SECTION THRU ℄ OF ROADWAY SHOWING MULTIPLE CULVERTS



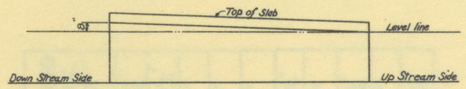
SECTION 'A-A'



SECTION 'B-B'



SECTION 'C-C'
SHOWING WIRE FABRIC REINFORCEMENT
Scale: 1"=1'-0"



SECTION SHOWING SLOPE OF ROADWAY

Materials required per Unit

One foot length of 18 Ft. Roadway slab 7" thick.
(Class 'A' Concrete, Mix 1:2½:3½)

Cement	2.41 Sacks
Sand	.202 Cu. yds.
Gravel or Stone	.315 Cu. yds.
Water (Moderate Exp.) 6½ Gal/sack of cement	15.68 Gal.
Wire Fabric - See note	

One foot length of 12 Ft. Roadway slab 7" thick.
(Class 'A' Concrete, Mix 1:2½:3½)

Cement	1.60 Sacks
Sand	.134 Cu. yds.
Gravel or Stone	.209 Cu. yds.
Water (Moderate Exp.) 6½ Gal/sack of cement	10.44 Gal.
Wire Fabric - See note	

Square Ft. of 10" Wall
(Class 'B' Concrete, Mix 1:2½:4½)

Cement	.16 Sacks
Sand	.015 Cu. yds.
Gravel or Stone	.027 Cu. yds.
Water (Moderate Exp.) 7 Gal/sack of cement	1.12 Gal.

Square Ft. of 12" Wall
(Class 'B' Concrete, Mix 1:2½:4½)

Cement	.196 Sacks
Sand	.018 Cu. yds.
Gravel or Stone	.032 Cu. yds.
Water (Moderate Exp.) 7 Gal/sack of cement	1.37 Gal.

Square Foot of 9" Slab
(Class 'A' Concrete, Mix 1: 2½: 3½)

Cement	.17 Sacks
Sand	.014 Cu. yds.
Gravel or Stone	.022 Cu. yds.
Water	1.11 Gal.
½" Reinforcing Steel (Single)	3.10 Lbs.
½" " " (Multiple)	4.40 Lbs.

Mortar required for 1 cu.ft. of Rubble Masonry

Portland Cement	.0750 Sacks
Sand - clean, coarse	.2250 Cu.ft.

Add sufficient Hydrated Lime To produces workable mortar. Mortar will be dry mixed in a tight box until uniform in color and then sufficient water will be added To produce a workable consistency. Mortar That has been mixed over 45 minutes will not be used in The work.

NOTE- Where multiple culverts are installed, interior walls on up stream side to be shaped to present a cutting edge.

NOTE:- The mesh reinforcement used will be electric welded, Two way, wire fabric reinforcement, No.6 gauge wires spaced 6"x6", weighing 42 lbs. per 100 sq.ft. This material is furnished in sheets 60"x150" in size. Manufacturers will not cut sheets.

Lap sheets 1 foot at ends. Use 3 rows of sheets for 16'-0" slab and 5 rows of sheets for 20'-0" slab. One lineal foot of wire fabric required for one lineal foot of slab plus one foot for overlap, for each 12'-6" length of slab, except first 12'-6" length.

Caution Signs (CF-1 or C-31, Plate 12, Road Sign Manual) should be placed at each side of single track crossings.

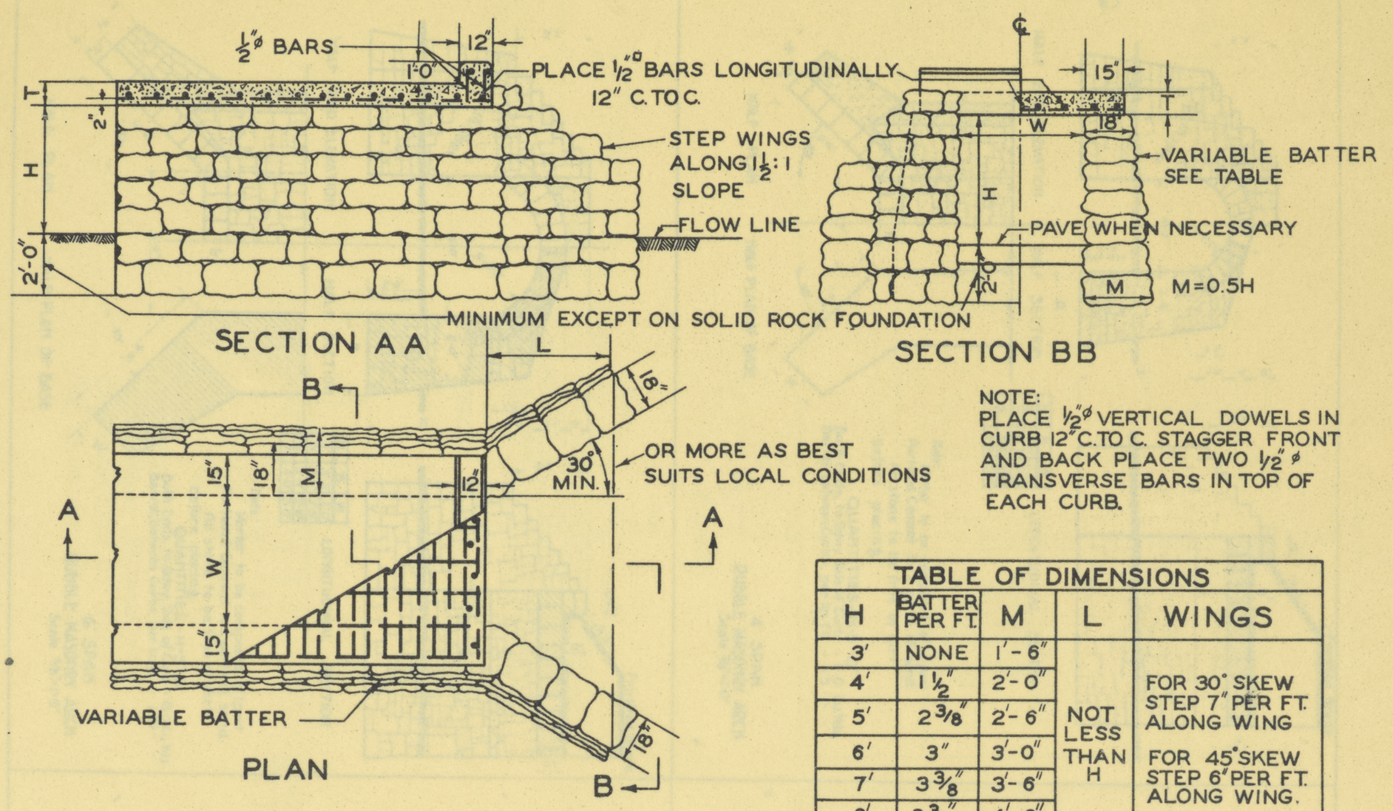
U.S. DEPT. OF AGRICULTURE
FOREST SERVICE REGION-9

LOW WATER CROSSING
NORMAL STREAM FLOW
CARRIED BY CONCRETE CULVERTS
PLAN NO. 22B

Designed by: M.G.
Traced by: E.G.H.
Date Mar. 12, 1934

Approved by H.G.
Scale: ½"=1'0" or as shown
Milwaukee, Wis.

Revised 12-11-34
" 6-18-35
" 10-3-35



NOTE:
PLACE ½"ø VERTICAL DOWELS IN CURB 12" C. TO C. STAGGER FRONT AND BACK PLACE TWO ½"ø TRANSVERSE BARS IN TOP OF EACH CURB.

TABLE OF DIMENSIONS				
H	BATTER PER FT.	M	L	WINGS
3'	NONE	1'-6"	NOT LESS THAN H	FOR 30° SKEW STEP 7" PER FT. ALONG WING. FOR 45° SKEW STEP 6" PER FT. ALONG WING.
4'	1½"	2'-0"		
5'	2⅜"	2'-6"		
6'	3"	3'-0"		
7'	3⅜"	3'-6"		
8'	3¾"	4'-0"		

SIZES AND SPACING OF TRANSVERSE BARS FOR ANY SLAB THICKNESS.

T = THICKNESS OF SLAB IN INCHES.

T	SIZE & SHAPE	SPACING C. TO C.
6"	½"□	6"
7"	½"□	5¼"
8"	⅝"ø	5½"
9"	⅝"ø	5"
10"	¾"ø	6"
11"	¾"ø	5"
12"	¾"ø	4¾"
13"	⅞"ø	6"
14"	⅞"ø	5½"
15"	⅞"ø	5"
16"	⅞"ø	4¾"

SLAB THICKNESS FOR ANY SPAN, ANY TYPE, AND ANY HEIGHT OF FILL OVER CULVERT.

SPAN W	HEIGHT OF FILL IN FEET FROM TOP OF SLAB TO TOP OF FILL									
	2	4	6	8	10	12	14	16	18	20
3'	6"	6"	6"	6"	6"	6"	7"	8"	8"	8"
4'	7"	7"	7"	7"	7"	7"	8"	9"	10"	
5'	8"	8"	8"	9"	9"	10"	11"	11"		
6'	9"	9"	10"	10"	10½"	11"	12"			
7'	9½"	9½"	10½"	11"	12"	13"				
8'	10"	10"	11"	12"	13"					
9'	11"	12"	13"	14"	15"					
10'	12"	12"	14"	15"	16"					

NOTE:
TRANSVERSE BARS ARE THOSE AT RIGHT ANGLES TO FLOW LINE OF CULVERT.

LONGITUDINAL BARS ARE THOSE PARALLEL TO FLOW LINE OF CULVERT.

TRANSVERSE BARS TO BE 3" SHORTER THAN OVERALL WIDTH OF CONCRETE SLAB.

LONGITUDINAL REINFORCING FOR ALL CULVERTS TO BE ½"□ BARS SPACED 12" C. TO C. BARS BEING 6" SHORTER THAN LENGTH OF CULVERT.

MORTAR: 1 PART CEMENT 3 PARTS CLEAN SHARP SAND.

U.S DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION EIGHT

MASONRY CULVERTS HEIGHT 3' TO 8' SPAN 5' TO 10'

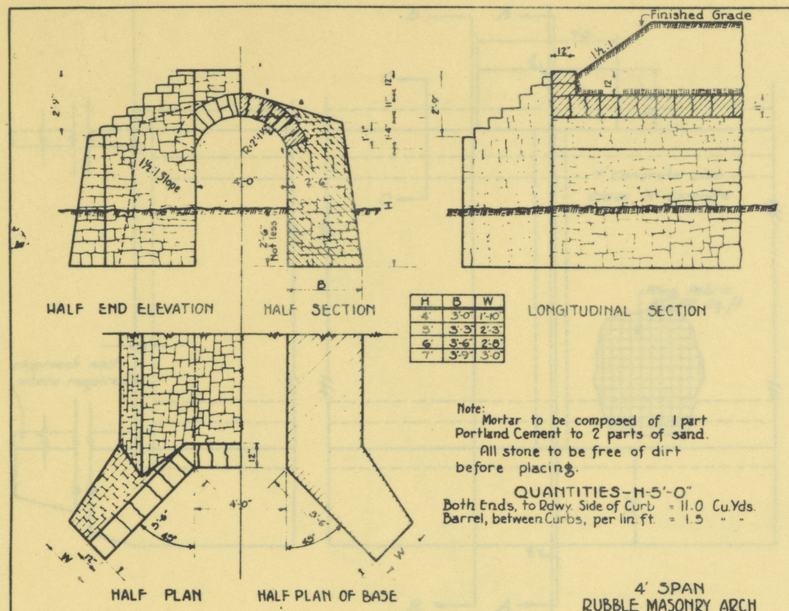
DESIGNER	B.M.G. CHECKER	G.F.V. TRACER

APPROVED BY [signature] REGIONAL ENGINEER DATE 2-5-36

NOTE: ADAPTED FROM REGION SEVEN DRAWING.

DRAWING C-1501

2433

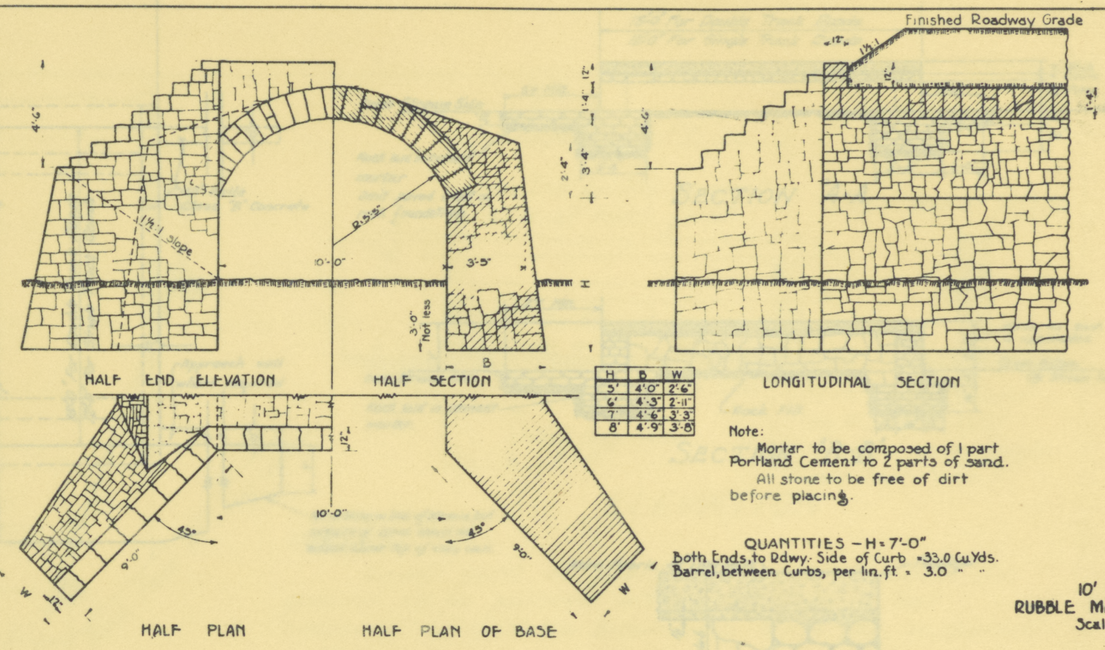


H	B	W
4'	3'-0"	1'-10"
5'	3'-3"	2'-3"
6'	3'-6"	2'-8"
7'	3'-9"	3'-0"

Note:
Mortar to be composed of 1 part Portland Cement to 2 parts of sand.
All stone to be free of dirt before placing.

QUANTITIES – H-5'-0"
Both Ends, to Rdwy Side of Curb = 11.0 Cu.Yds.
Barrel, between Curbs, per lin. ft. = 1.5 " "

4' SPAN
RUBBLE MASONRY ARCH
Scale 3/8"=1'-0"

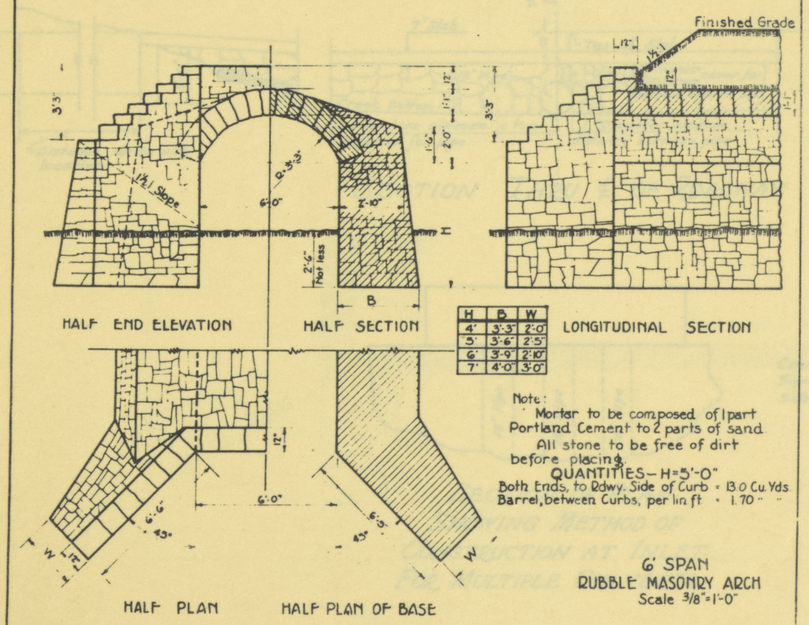


H	B	W
5'	4'-0"	2'-6"
6'	4'-3"	2'-11"
7'	4'-6"	3'-3"
8'	4'-9"	3'-8"

Note:
Mortar to be composed of 1 part Portland Cement to 2 parts of sand.
All stone to be free of dirt before placing.

QUANTITIES – H = 7'-0"
Both Ends, to Rdwy. Side of Curb = 33.0 Cu.Yds.
Barrel, between Curbs, per lin. ft. = 3.0 " "

10' SPAN
RUBBLE MASONRY ARCH
Scale 3/8"=1'-0"

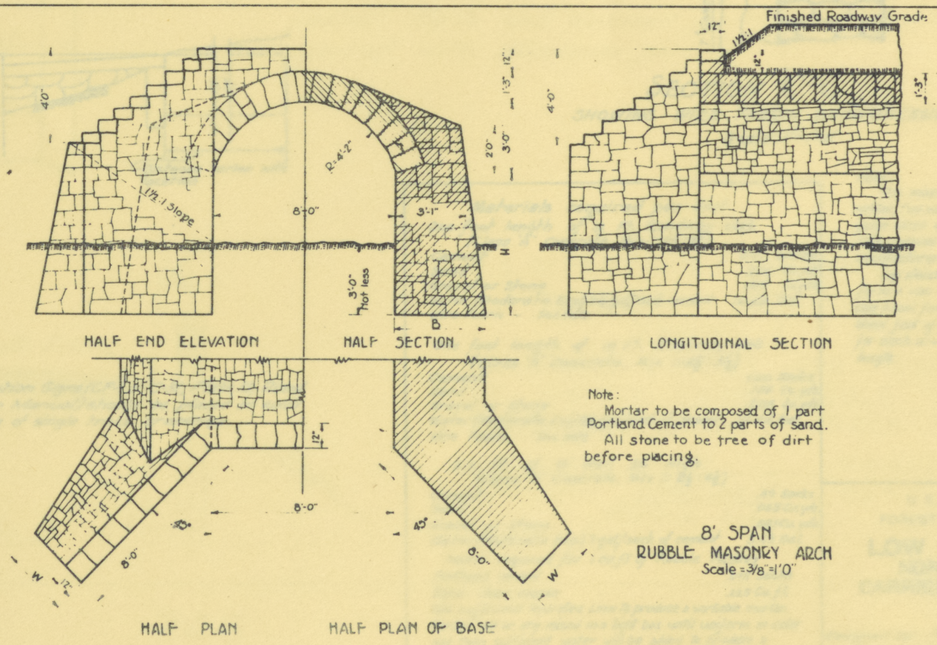


H	B	W
4'	3'-3"	2'-0"
5'	3'-6"	2'-5"
6'	3'-9"	2'-10"
7'	4'-0"	3'-0"

Note:
Mortar to be composed of 1 part Portland Cement to 2 parts of sand.
All stone to be free of dirt before placing.

QUANTITIES – H=5'-0"
Both Ends, to Rdwy. Side of Curb = 13.0 Cu.Yds
Barrel, between Curbs, per lin.ft = 1.70 " "

6' SPAN
RUBBLE MASONRY ARCH
Scale 3/8"=1'-0"



QUANTITIES- H = 6'-0"
Both Ends, to Rdwy- Side of Curb = 25.0 Cu.Yds
Barrel, between Curbs, per lin.ft = 2.5 " "

H	B	W
5'	3'-9"	2'-6"
6'	4'-0"	2'-11"
7'	4'-3"	3'-4"
8'	4'-6"	3'-9"

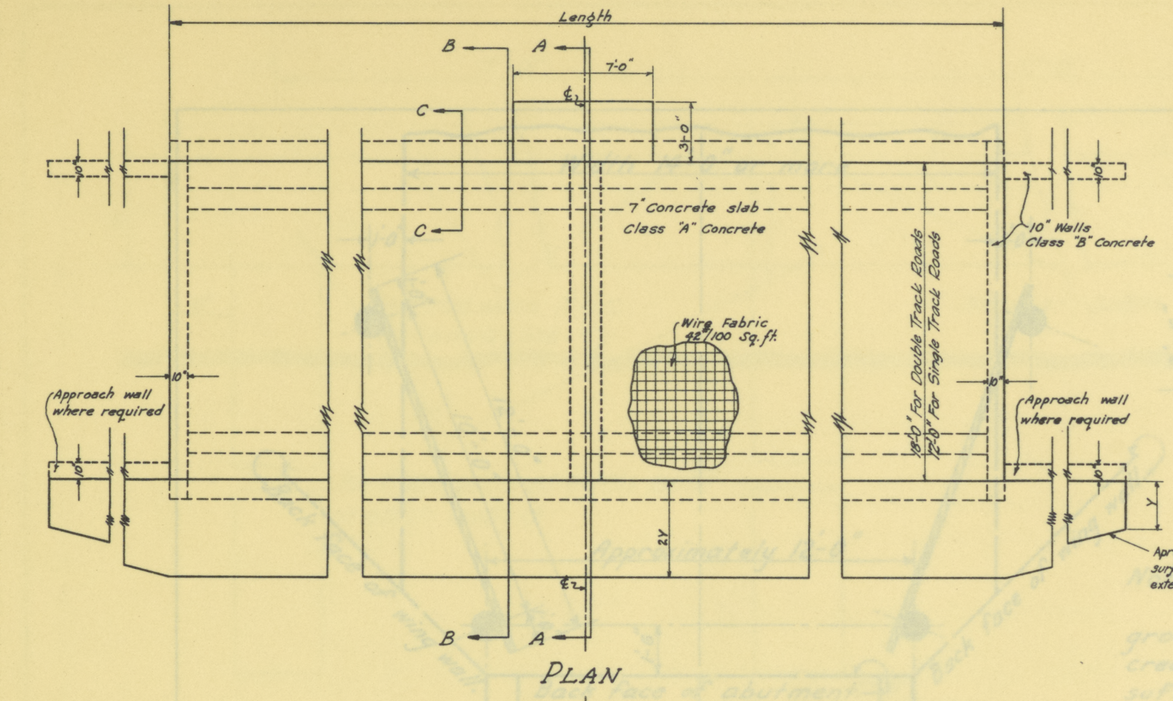
Note:
Mortar to be composed of 1 part Portland Cement to 2 parts of sand.
All stone to be free of dirt before placing.

8' SPAN
RUBBLE MASONRY ARCH
Scale = 3/8"=1'-0"

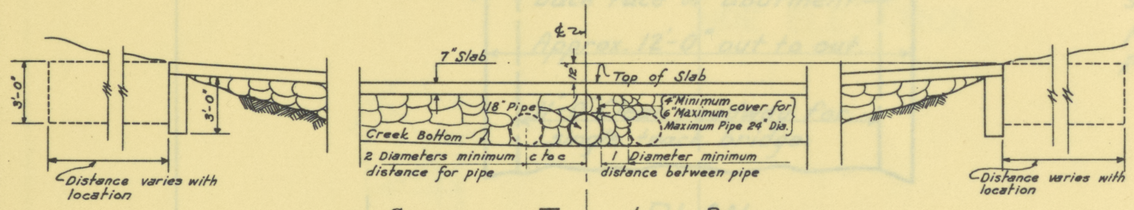
Designed O. J. Kalt
Traced PWT
Checked
Approved L. R. V. Thiesen 12/4/34 Regional Engineer

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION No. 1
RUBBLE MASONRY ARCH CULVERTS
4'-6'-8'-10' SPANS
Scale 3/8"=1'-0"
Dec. 1935

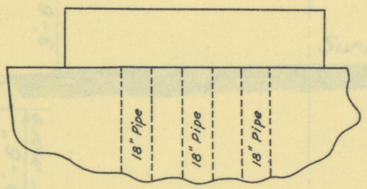
DRG. No. 187



PLAN

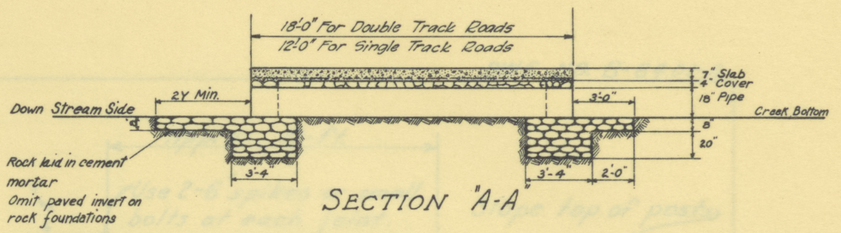


SECTION THRU ℄ OF ROADWAY

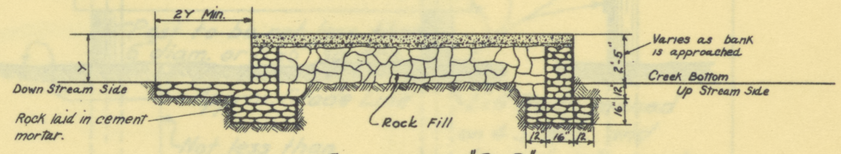


SECTION OF PLAN
SHOWING METHOD OF
CONSTRUCTION AT INLET
FOR MULTIPLE CULVERTS

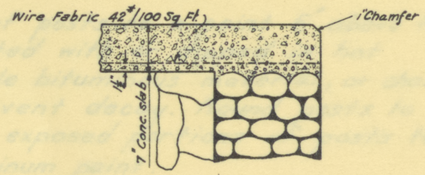
Caution Signs (CF-1 or C-31, Plate 12, Road Sign Manual) should be placed on each side of single track crossings.



SECTION "A-A



SECTION "B-B"



SECTION "C-C"
SHOWING WIRE FABRIC REINFORCEMENT
Scale: 1"=1'-0"

Materials required per Unit

One foot length of 18 Ft. Roadway slab
(Class "A" Concrete, Mix 1: 2½ : 3½)

Cement	2.41 Sacks
Sand	.202 Cu. yds.
Gravel or Stone	.315 Cu. yds.
Water (Moderate Exp.) 6½ Gal/sack cement	15.68 Gal.
Wire Fabric - See note	

One foot length of 12 Ft. Roadway slab
(Class "A" Concrete, Mix 1: 2½ : 3½)

Cement	1.60 Sacks
Sand	.134 Cu. yds.
Gravel or Stone	.208 Cu. yds.
Water (Moderate Exp.) 6½ Gal./sack of cement	10.44 Gal.
Wire Fabric - See note	

Lin. Ft. of 10" Wall 36" High
(Class "B" Concrete, Mix 1: 2½ : 4½)

Cement	.49 Sacks
Sand	.045 Cu. yds.
Gravel or Stone	.081 Cu. yds.
Water (Moderate Exp.) 7 Gal/sack of cement	3.43 Gal.

Mortar required for 1 cu. ft. of Rubble Masonry

Portland cement	.075 Sacks
Sand - clean, coarse	.225 Cu. ft.

Add sufficient Hydrated Lime to produce a workable mortar. Mortar will be dry mixed in a tight box until uniform in color and then sufficient water will be added to produce a workable consistency. Mortar that has been mixed over 45 minutes will not be used in the work.

NOTE:-
The mesh reinforcement used will be electric welded, Two way, wire fabric reinforcement, No. 6 gauge wires spaced 6"x6", weighing 42 lbs. per 100 sq. ft. This material is furnished in sheets 60" x 150" in size. Manufacturers will not cut sheets.

Lap sheets one foot at ends. Use 3 rows of sheets for 14'-0" slab and 5 rows of sheets for 20'-0" slab. One lineal foot of wire fabric required for one lineal foot of slab plus one lineal foot, for overlap, for each 12'-6" length of slab, except first 12'-6" length.

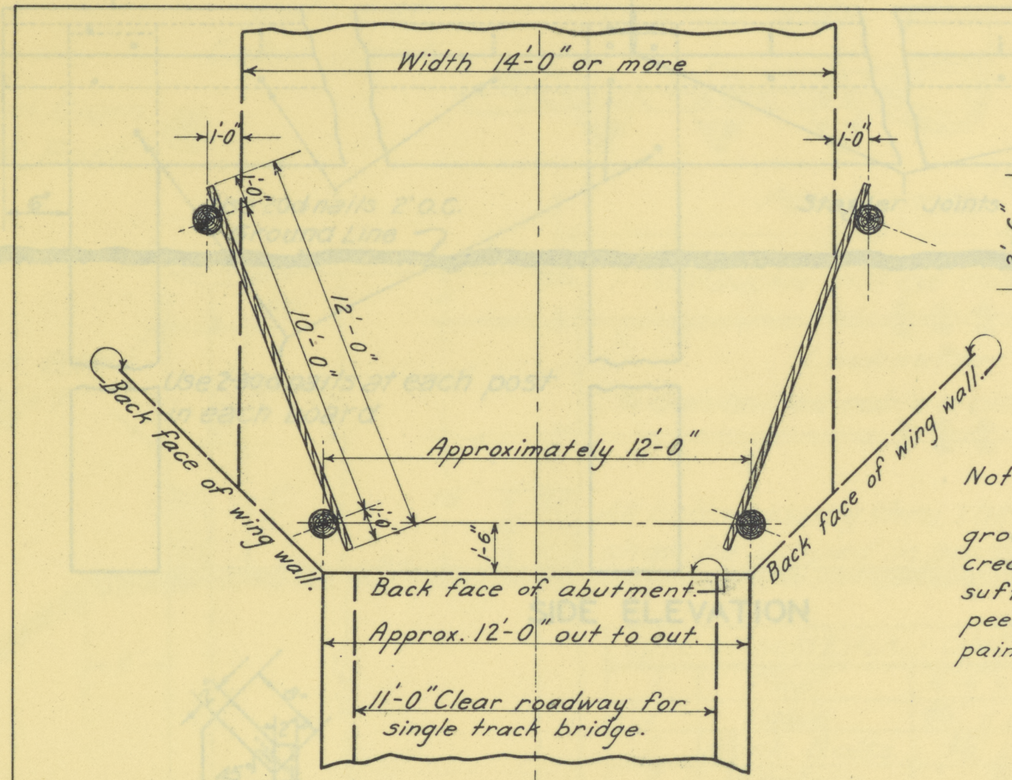
U. S. DEPT. OF AGRICULTURE
FOREST SERVICE REGION-9

LOW WATER CROSSING
NORMAL STREAM FLOW
CARRIED BY METAL CULVERTS
PLAN NO. 22C

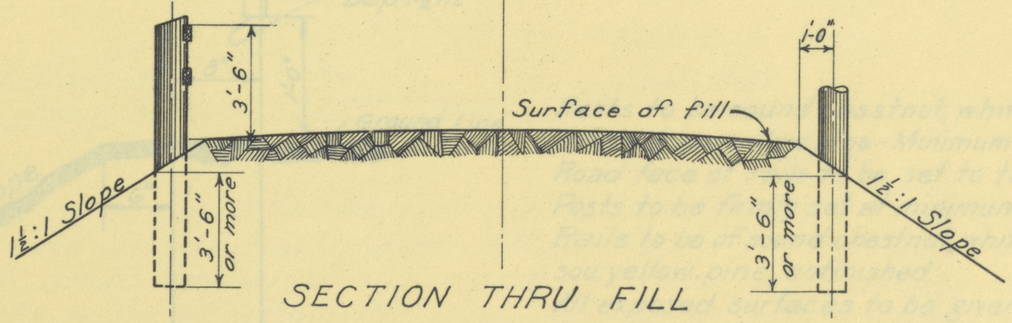
Designed by: M. G. Approved by H. C.
Traced by: J. O. Scale: ½"=1'-0" or as shown
Date Mar. 12, 1934 Milwaukee, Wis.

Revised 12-12-34
" 5-16-35
" 10-31-35

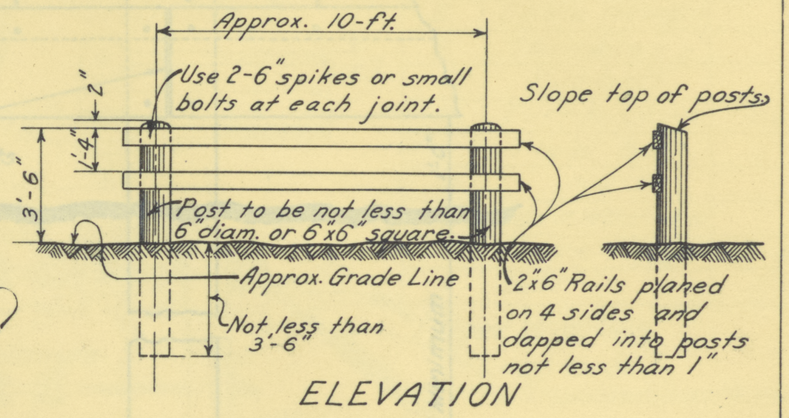
DWG. NO. B-6401-A



PLAN



SECTION THRU FILL



ELEVATION

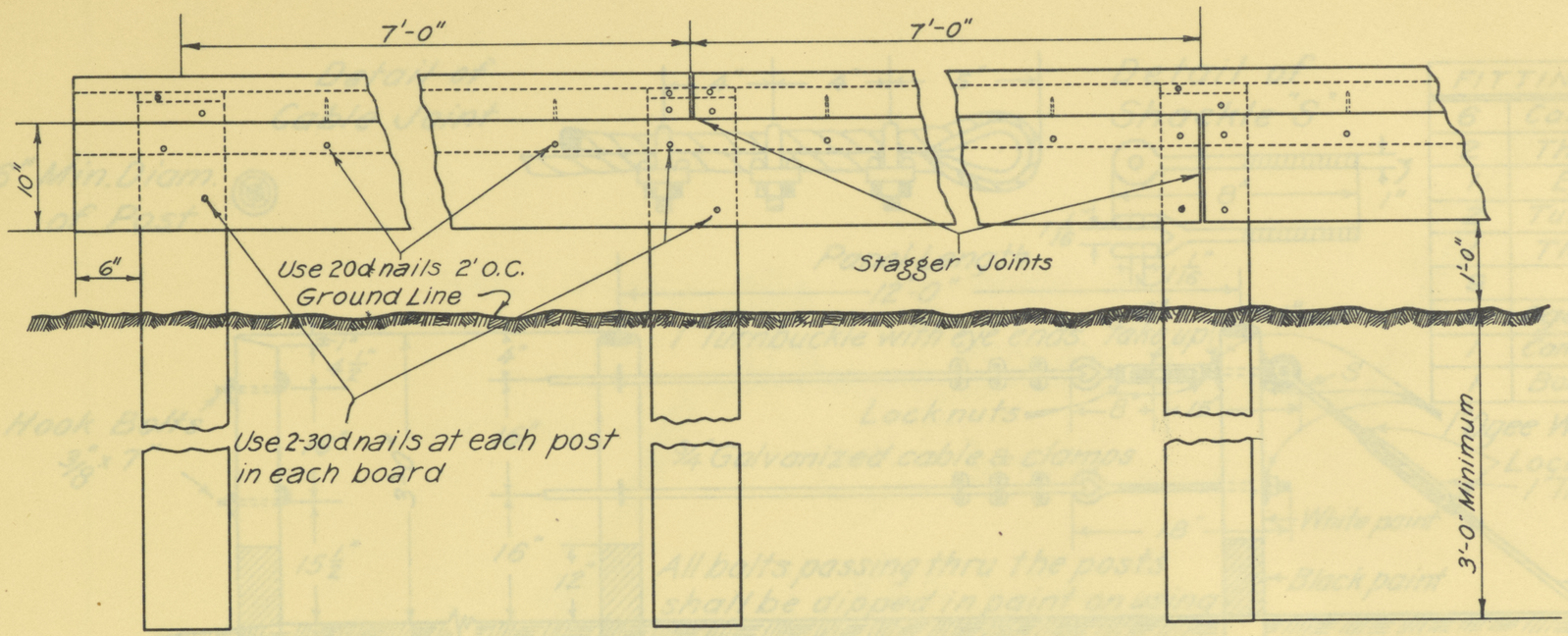
Notes:—

Lower part of posts to a point 6" above the ground to be painted with or dipped in hot creosote or suitable bituminous material, or charred sufficiently to prevent decay. Round posts to be peeled. Rails and exposed portions of posts to be painted with Aluminum paint.

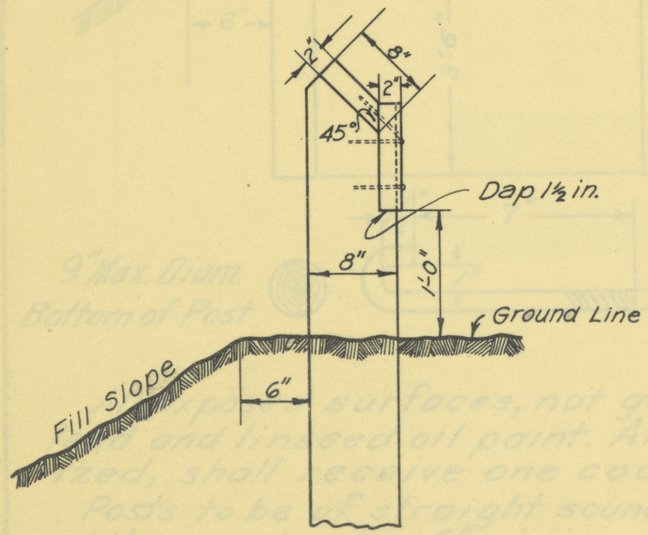
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 7

STANDARD LAYOUT FOR GUARDRAIL AT BRIDGE ENDS, DOUBLE TRACK ROAD AND SINGLE TRACK BRIDGE

DRAWN G. W. R. TRACED M.E.G.
APPROVED _____ DATE April 1933
Regional Eng.



SIDE ELEVATION



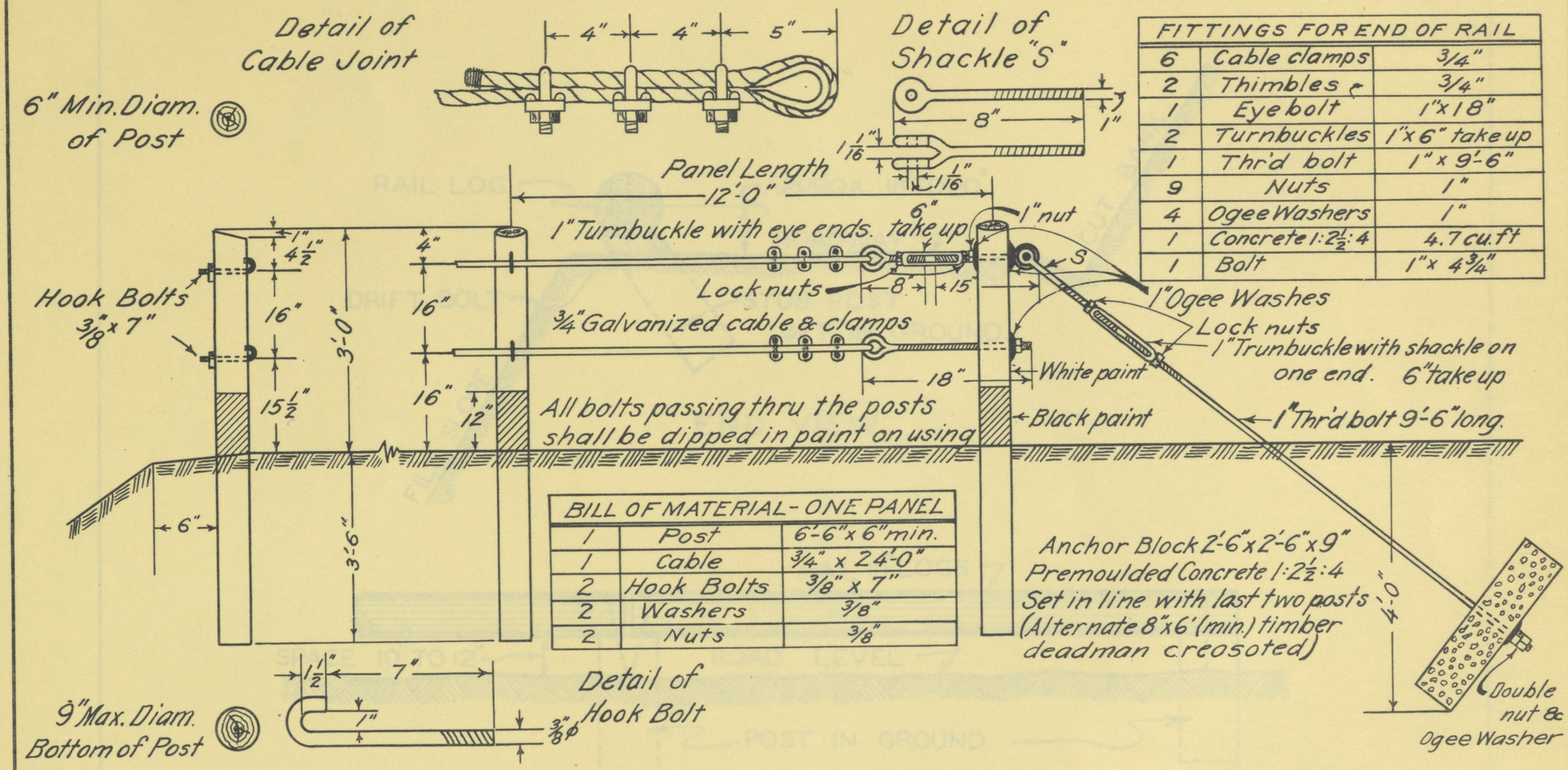
END ELEVATION

Posts to be sound chestnut, white oak, locust or treated sou. yellow pine - Minimum 8" dia. or 6"x8" sawed
Road face of rails to be set to true line
Posts to be firmly set at minimum of 3' in ground
Rails to be of sound chestnut, white oak, locust, or sou. yellow pine., unfinished
All exposed surfaces to be given 2 coats of aluminum paint.

U.S. DEPT. OF AGRICULTURE
FOREST SERVICE
REGION EIGHT

WOOD GUARD RAIL

DRAWN BY G.F.V. DATE 8/19/35. DRAWING NUMBER
APPROVED DATE 8/21/35 B-6403



FITTINGS FOR END OF RAIL		
6	Cable clamps	3/4"
2	Thimbles	3/4"
1	Eye bolt	1" x 18"
2	Turnbuckles	1" x 6" take up
1	Thr'd bolt	1" x 9'-6"
9	Nuts	1"
4	Ogee Washers	1"
1	Concrete 1:2 1/2:4	4.7 cu. ft
1	Bolt	1" x 4 3/4"

BILL OF MATERIAL - ONE PANEL		
1	Post	6'-6" x 6" min.
1	Cable	3/4" x 24'-0"
2	Hook Bolts	3/8" x 7"
2	Washers	3/8"
2	Nuts	3/8"

All exposed surfaces, not galvanized, to have 3 coats of white lead and linseed oil paint. All surfaces in contact, not galvanized, shall receive one coat of above paint before construction.

Posts to be of straight sound chestnut, white oak, yel. locust, white or red cedar, 6" minimum diameter, round posts, creosoted by dipping the lower 4'-6"

All iron and steel to be galvanized, except cast iron.

In order to secure proper alignment, bolt holes shall be bored and tops of posts trimmed after posts are set.

Splicing cables will not be permitted

U. S. DEPARTMENT OF AGRICULTURE

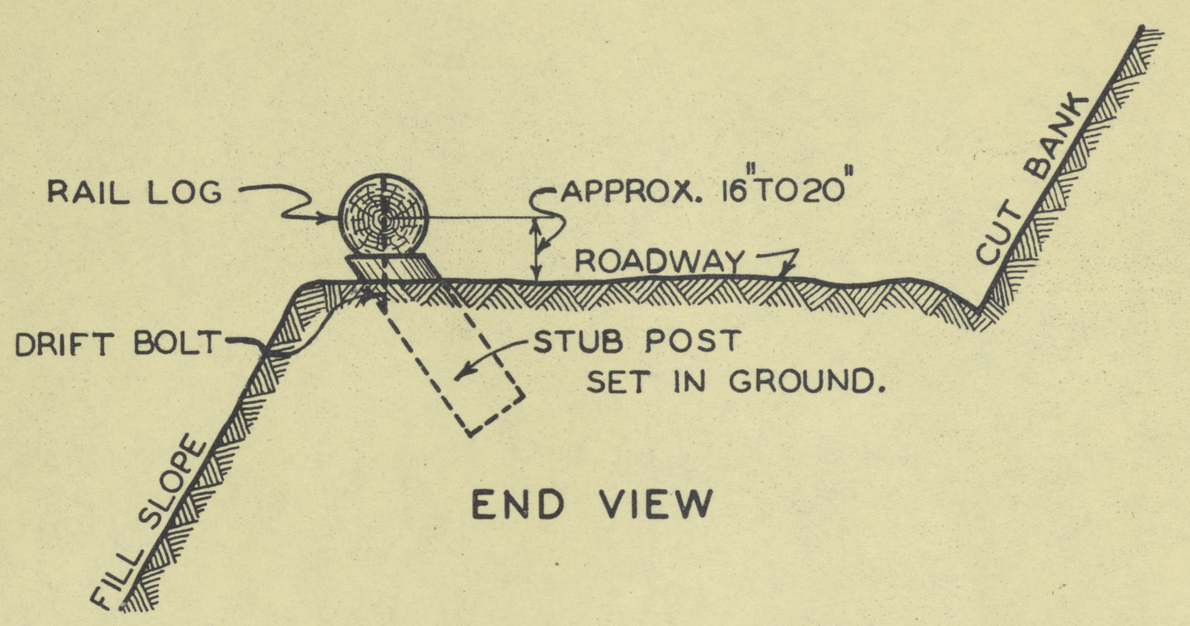
FOREST SERVICE

REGION 7

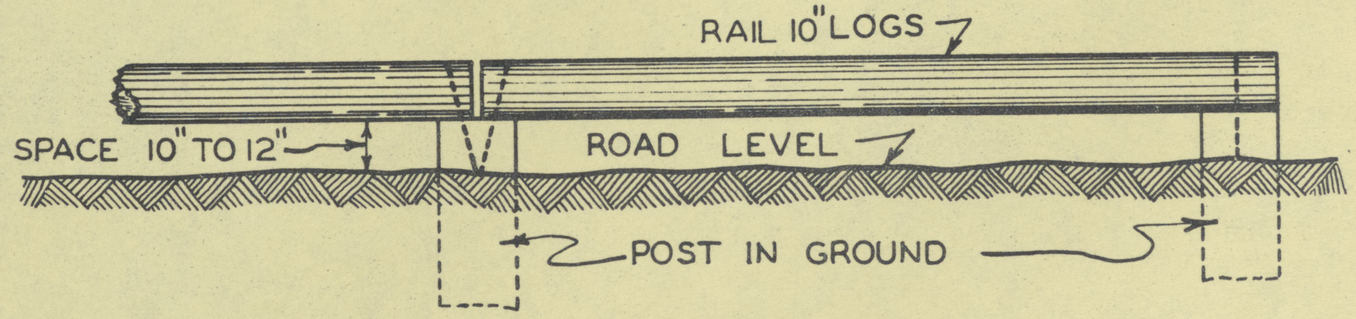
CABLE GUARD RAIL

FEB. 24, 1930

B6402G



END VIEW



SIDE VIEW

LOG GUARD RAIL

REVISED 2-4-36

DWG. NO. M-701

U. S. DEPARTMENT OF AGRICULTURE
LIBRARY

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Please return all books promptly after finishing your use of them, in order that they may be available for reference by other persons who need to use them.

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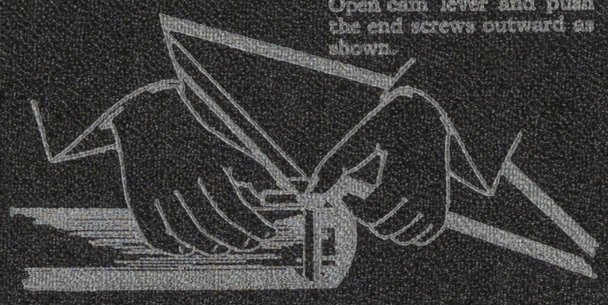
The mutilation, destruction, or theft of Library property is punishable by law. (20 Stat. 171, June 15, 1878.)

Lib. 9 GPO

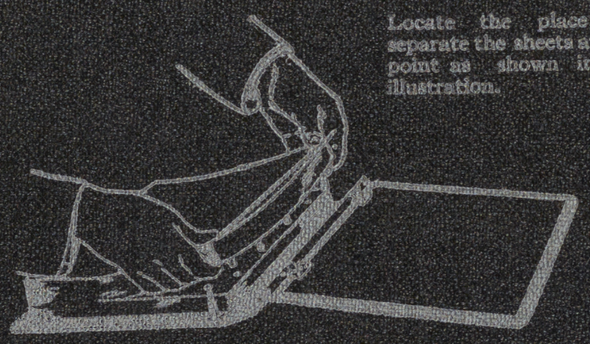
3—7888

HOW TO OPERATE THIS BINDER

Open cam lever and push the end screws outward as shown.



Locate the place and separate the sheets at that point as shown in the illustration.



Turn the entire upper portion of the sheet over and lay it upon the cover as shown below.

To close binder merely reverse this operation.

THE STYLE "L" BINDER
JOB # 251-E-3147
BAKER-VAWTER-KALAMAZOO DIV.
REMINGTON RAND INC.
BENTON HARBOR, MICH.
PATENTED
JULY 19, 1921, MARCH 28, 1922
DEC. 26, 1922, MAY 20, 1925
OTHER PATENTS PENDING
MADE IN U. S. A.